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THE UNIVERSITY OF ALBERTA

INTERREGIONAL COMPETITION  
IN  
THE WESTERN CANADIAN MARKET  
FOR  
EIGHT FRESH VEGETABLES

A THESIS  
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES  
IN PARTIAL FULFILMENT OF  
THE REQUIREMENTS FOR  
THE DEGREE OF MASTER OF ARTS

DEPARTMENT OF POLITICAL ECONOMY

by

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## INTRODUCTION

From time to time one hears different individuals comment upon the large proportion of fresh vegetables that are imported annually into Western Canada. Many of the vegetables mentioned are commonly grown in family gardens in all parts of Western Canada. Often, reference is made to the irrigation lands in Southern Alberta as a potential area for the production of a number of these specialty crops, and it is said that such production is stifled by an "unorganized" market. The market, it is maintained, "is there" but the Alberta producers are unable to capture it because of barriers in the chain of marketing. The barriers, it is suggested, are the lack of contact between the farmer and the wholesale dealers, and the lack of imagination on the part of the producer or the middleman to place Alberta-grown produce in fancy containers and thereby compete with imports on the same footing. Another barrier in the market, that has often been mentioned, is a lack of continuity in the local supply and the unreliability of the local producer in supplying the wholesale firms.

It is not the objective of this study to take issue with the above suggestions with regard to barriers that may exist in the chain of marketing. What is intended is to make clear the fact that





there are even more fundamental reasons why certain vegetables that are grown in Alberta have not entered the commercial market to any great extent, and conceivably will not enter the market in large volumes in the near future. This is not a statement that may be applied generally. There are certain commodities that are produced on a large commercial scale in Alberta. The fundamental reasons, we trust, will become obvious in the study.

The eight vegetables that have been selected in this study are as follows: cabbages, carrots, celery, corn, onions, potatoes, tomatoes, and turnips. These vegetables were selected on the criteria that they were either being grown in Alberta on a commercial scale or had a possibility of being grown on a commercial scale. In addition, of all the fresh vegetables sold, the eight selected rank amongst the highest according to the quantities that enter the commercial markets in Western Canada.<sup>1</sup>

The reader is forewarned that this study is strictly an analysis of the markets in Western Canada for fresh vegetables. In this study an attempt is made to assess Alberta's position as an area of supply relative to other areas of supply that sell fresh produce in Western Canada. While at first sight the conclusions may seem rather pessimistic it should be remembered that we are dealing with commodities that are grown in Alberta on a seasonal basis, and that they are

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<sup>1</sup>One other commodity that enters the Western Canadian markets in large quantities is lettuce. But, as was pointed out by a vegetable crop specialist at Lethbridge, the frequency with which high winds accompanied by the movement of soil particles occur in Southern Alberta is not conducive to the production of high quality lettuce.



for the most part highly perishable. Consequently, because of the storage factor, an analogy should not be drawn between the production of vegetables in Alberta for the fresh market and those which go into the processed market.

The focal point in this study is the quantity of each commodity that is purchased by wholesale firms or by licensed vegetable dealers for resale to retail stores and to institutions. The quantity of each commodity that is purchased by wholesalers and by licensed vegetable dealers during the period of one year is referred to as the size of the commercial market.

It is recognized that the commercial markets in Western Canada for fresh vegetables are imperfect. The situation is in fact one of oligopsony in which a few wholesale firms dominate the buying side of the market while the selling side is composed of many sellers or producers. It is probably true that recognition of circular interdependence among the wholesale firms is an important factor in determining the wholesale price of local grown produce. However, when numerous areas of supply are considered, including the local area, it is argued that wholesale firms seek their supplies from those areas which can deliver produce of acceptable quality at the lowest cost. Consequently, throughout this study an assumption has been made that the markets are perfect or nearly perfect, at least to the extent that the present movement of fresh vegetables in Western Canada would not be substantially altered if all markets were perfect.

The data which this study is based upon are the quantities of the eight commodities that have entered the commercial markets



in Western Canada on a monthly basis from July 1955 through June 1960. The data are recorded in summary form in Appendices I and II. A description of the data is also included in the Appendices.

Much of the information that would have been useful in this study is unobtainable. Information pertaining to the yields, acreages, and the costs of production, of each of the eight commodities in Alberta and in each of the other areas supplying Western Canada for the most part could not be obtained. On the other hand, information pertaining to the costs of transportation is very specific. This cost depends on the nature of the commodity, the mode of transportation, the time, the exact origin and the exact destination. Consequently, in order to avoid becoming lost in detail all references to the costs of transportation have been generalized so as to give only a range of the costs from different areas of supply to the different areas within Western Canada.

The period of time that has been selected as a "norm" in this study is a crop year July through June based on the five-year average from July 1955 through June 1960. For those calculations which reduce the quantities consumed to a per capita basis, one may expect only a minor change to occur over an extended period of time. For those quantities listed as absolute amounts, such as the size of the commercial market, any comparison with another period of time would necessarily have to take into consideration changes in the population and other factors that are associated with a dynamic economy.

Neither demand curves nor supply curves are derived in this study. The difficulties in doing so become obvious





throughout the study. However, the concepts of demand and supply are important as a background. Consequently, in the following chapter some of the more relevant aspects of demand and supply are discussed.



## CHAPTER I

### CONCEPTS OF DEMAND AND SUPPLY

When economists speak or write about demand they use the term in the sense of a demand schedule.<sup>1</sup> A demand schedule for an individual is a statement, usually in the form of a table or a diagram, of the amounts of a commodity that he is willing to purchase at various prices at a given time. A demand curve, dd, for Individual A is illustrated in Figure 1. At a price of \$1.20 per widget Individual A is willing to purchase only 1 widget per unit of time, paying \$1.20 for it. However, at a lower price of \$0.40 per widget he is willing to purchase 5 widgets paying a total of \$2.00. This does not mean that A's demand for widgets has changed. It means that more or less of a commodity is purchased when there is a change in the price. In terms of the graph, sliding down a given demand curve, or sliding up the curve involves no change in the demand for the commodity.

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<sup>1</sup>There are a number of text books on economic theory in which the concepts, the derivation, and the shape of demand and supply curves are fully discussed. E.g., Richard H. Leftwick - The Price System and Resource Allocation, New York, 1955. Alfred Marshall, Principles of Economics, London, 1920, Bk. III.



A change in the demand occurs when the wants of the individual change so that he is willing to purchase either more or less of a commodity at a given price per unit. As an example, if A's desire for widgets changes so that he is willing to purchase 2 widgets at a price of \$1.20 per widget and 6 widgets if the price is \$0.40 per widget, we could say that A's demand for widgets increases,

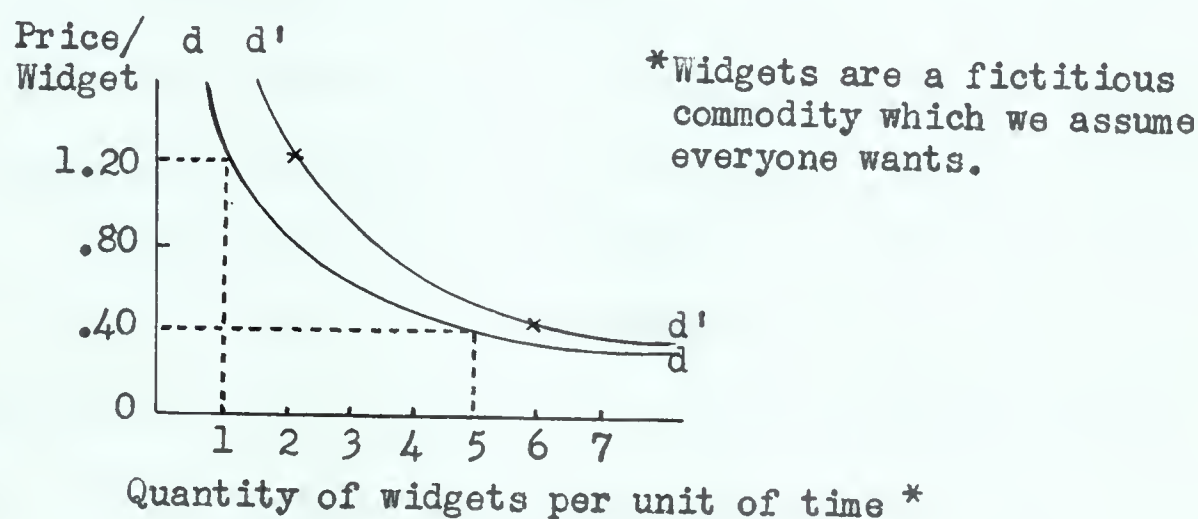


Figure 1.- The Demand Curve

or that his demand curve for widgets shifts to the right,  $d'd'$  in Figure 1.

Demand is usually spoken of in terms of the market demand for a given commodity. The market demand is the summation of all the individual demand schedules for a given commodity. A market demand schedule shows the amounts of a given commodity purchased at different possible prices in a given market at a particular time.

It is perhaps necessary to mention the factors that shift or cause a change in the market demand curve. There are four factors which may cause the market demand curve to shift either to the right or the left. First, a change in tastes may cause consumers





to purchase less of one good and more of another good. Second, a change in the price of substitute goods may cause consumers to change their purchasing habits. This is also true of the third factor which is a change in income. In the following analysis the assumption is made that the above factors remain constant. The fourth factor which may shift the demand curve is changes in the population. In this study the assumption is made that changes in the size of the total population and changes in the proportions of the different sectors of the population are the only factors that shift the demand curve by a substantial amount, and are consequently reflected in the size of the commercial market.

Supply, as in the case of demand, is generally considered to mean a supply schedule. The supply schedule shows the amounts of a commodity offered for sale in a given market at different prices at a given time. While the demand curve generally slopes downward and to the right the supply curve generally slopes upward and to the right.

Three types of supply curves have been cited by Alfred Marshall, each associated with a different length of time.<sup>2</sup> The first type is the market supply curve, which relates to the marketing of supplies already in existence. It is a simple curve but an extremely unstable one. It is affected only indirectly by the physical condition of production. The second type is the short run normal supply curve which is associated with a period of time that is long enough to allow producers to alter the variable factors of production

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<sup>2</sup> Alfred Marshall, op. cit., Book V.



but not the fixed factors of production. And third, the long run normal supply curve is associated with a period of time that allows producers to vary all the factors of production. In the following analysis it is the long run normal curve that is the most appropriate curve to associate with the comparative advantage of different areas of supply to the Western Canadian markets.

The forces that shift the supply curve depend in part upon which type of curve is under consideration. In the case of the market supply curve the perishability of the commodity and the psychological reactions of the holders of the supplies are important forces that may cause shifts in the supply curve. On the other hand, the long run normal curve is almost entirely dependent upon the costs of production. Hence the forces that shift the long run supply curve, must either increase or decrease the costs of production. Two important forces which decrease the costs of production are internal economies and external economies. Under the assumption of pure competition, each of these forces will be discussed in turn.

Internal economies are under the control of the firm, or the producer. They are associated with economies of scale. Two important economies of scale are (1) increasing possibilities of division and specialization of labour, and (2) increasing possibilities of using advanced technological developments and/or larger machines. The economies of scale are brought about by increasing the size of the production unit until it is the most efficient that the firm or the producer can build.

On the other hand, the individual firm or producer



has no influence over external economies. In the case of external economies the price that firms must pay for resources goes down as new firms enter the industry and as old firms expand. The conceivable causes of declining resource prices may be explained by considering an industry that is fairly young, growing up in a relatively new territory. Under these circumstances transportation facilities and the organization of markets, both for resources and the final product, may not be well developed. An increase in the number of firms in the industry may make feasible the development of improved transportation facilities and marketing facilities which will substantially reduce the costs of the individual firms.

Just as internal and external economies exist so do internal and external diseconomies. Internal diseconomies occur as a result of poor organization within the firm. If the firm expands beyond the optimum scale inefficiency develops as a result of difficulties in co-ordinating the factors of production on the part of management. External diseconomies are beyond the control of the firm. They result from the price of resources increasing, not as the result of the actions of one firm, but the result of firms acting collectively bidding up the price of resources.

Mention should also be made of the influence of weather in causing shifts in the supply curve. Annual variations in supply may come about as a result of erratic changes in the weather conditions. Such changes, however, affect the short run normal supply





curve and not the long run normal curve, since the time period involved in the latter is supposedly long enough to average out annual variations in supply caused by the weather. In this study the data have been averaged over a five-year period so as to minimize the effect of annual variations in supply due to weather conditions.

It is very difficult, if not impossible, to construct empirical demand curves or supply curves that are close approximations to the theoretical curves.<sup>3</sup> Without becoming involved in the technicalities surrounding the construction of empirical curves, it is nevertheless, important to this study to recognize some of the conditions that are essential in their construction. First, the curves must be relative to a specific market area. Second, the commodity must be homogeneous. Third, a specific unit of time must be decided upon and, fourth, an assumption must be made that during the designated period of time the curve in question does not shift. These, of course, are very exacting conditions and are hard to obtain, especially in the case of long run normal supply curves.

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<sup>3</sup>For a discussion on the derivation of empirical demand curves and supply curves see:

John M. Cassels, "The Nature of Statistical Supply Curves"  
Journal of Farm Economics, Vol. 15, 1933, pp.  
378-387.

Mordecai Ezekiel, "Statistical Analyses and the 'Laws' of Price"  
Quarterly Journal of Economics, Vol. 42, 1927,  
pp. 199-227.

George J. Stigler, "The Limitations of Statistical Demand Curves"  
Journal of American Statistical Association,  
Vol. 34, 1939, pp. 469-481.



## CHAPTER II

### THE DEMAND FOR EIGHT FRESH VEGETABLES IN WESTERN CANADA

It should be made clear that the data used in this chapter are not sufficient to produce approximations to the demand schedules for the commodities under study. Western Canada is a very large geographic area. Within this area numerous local markets exist in which prices move in the same general direction. The individual markets, nevertheless, reflect local differences in price arising from slightly differing degrees of elasticities of supply and demand, and also the differences in the degree of competition forced upon the middlemen in the marketing channel as either buyers or sellers. Not only are there numerous local markets in Western Canada, but within them many different grades of each type of vegetable are offered for sale. In each local market each grade sells at a slightly different price per pound. For example, in the Saskatoon market, local grown grade 1 potatoes may sell at slightly higher prices than grade 2 potatoes. Manitoba Reds may secure another price, and California and Washington potatoes a different one still. It should be obvious, then, that to speak of demand in the sense of demand schedules, each local market would have to be considered separately and each commodity would have to be differentiated



by grade and origin. To attempt to aggregate the demand curves of all the local markets into an aggregate curve for Western Canada would be an impossible task.

The consumption of each of the fresh vegetables in a given period can be measured, however, and this can be considered as a measure of the size of the market, other factors remaining the same. For the present purpose, a distinction must be drawn between the consumption in total and consumption which is satisfied through the commercial market.

The commercial market is a measure of the quantities of vegetables purchased by wholesale firms and licensed vegetable dealers during a given period of time and at the existing range of wholesale market prices during that period. The vegetables are purchased for the purpose of distributing them to retail stores and commercial institutions. Very often, additional value is added to the commodity before sale in the form of regrading, washing and packing the vegetables into "consumer packs". From the producer's point of view the total quantity moving to market in this way is a measure of the size of the total market for his product.

Total consumption, on the other hand, is made up of three distinct parts: 1) self-supplies; 2) quantities that are marketed but do not pass through the commercial market; 3) those quantities which do pass through commercial markets. Self supplies, of course, consist of vegetables grown in family gardens. The quantities marketed that do not pass through the commercial market are direct sales of vegetables by the producer to the consumer, or





those sales handled by jobbers or peddlers who obtain their supplies direct from the producer, and not from a wholesale firm or a licensed vegetable dealer.

The population which consumes vegetables must also be considered in three sectors: 1) urban, 2) rural nonfarm, and 3) farm.<sup>1</sup> The urban sector is the most dependent upon the commercial market for its supply of vegetables. The rural nonfarm sector may depend less upon the commercial market for its supply of vegetables. The third group, the farm sector, may depend upon the commercial market to a very small extent. For example, for a vegetable that can be stored for a considerable period, such as potatoes, the farm sector may rely almost entirely on noncommercial supplies.

The consumption of vegetables through the commercial market is obviously not the total consumption by the population of Western Canada. It is necessary however, to know what proportion it is of total consumption. The commercial market consists of imports plus the vegetables grown domestically, that are sold to wholesale firms and to licensed vegetable dealers. The actual measurement of the commercial market is made in Appendix I, where the total quantities entering the commercial markets of Western Canada as a whole, and the western provinces individually, are shown on a monthly basis for the period of July 1955 through June 1960.

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<sup>1</sup>The definitions of population used here have been taken from the Dominion Bureau of Statistics. Urban population is defined as the number of people who reside in centres of one thousand or more. Rural-nonfarm is the number of people who do not reside on farms but who live in centres of less than one thousand. Farm population is the number of people who reside on farms.



The sales in this market show a considerable seasonal variation. In the case of vegetables such as cabbages and carrots, the largest quantities enter the market during the months of February through June. This may be due, partially, to seasonality in consumption. It is possible that different rates of consumption take place during the different months of the year. The second possibility is that the largest quantities enter the commercial market during the months when noncommercial supplies are short or non-existent. The latter seems to be the most logical explanation, since the largest quantities enter the commercial market during the months when self supplies are scarce.

If it is assumed that the seasonality is the result of dependence on self supplies in certain months and that no seasonality in consumption exists, it is possible to calculate the size of total consumption.

The measurement of total consumption is illustrated diagrammatically in Figure 2. The commercial market is represented by stage 1. This is a measure of the quantity of each vegetable that enters the commercial market each month, as recorded in Appendix I. As previously mentioned, the sales in this market are seasonal. The largest quantities enter this market during the months that self-supplies are scarce. This is true of all the commodities except corn, which we shall exclude for the moment. It follows, then, that months in which certain sectors of the population are wholly dependent upon the commercial market must be those months in which self supplies, or noneommercial supplies are scarce. Thus by basing the annual



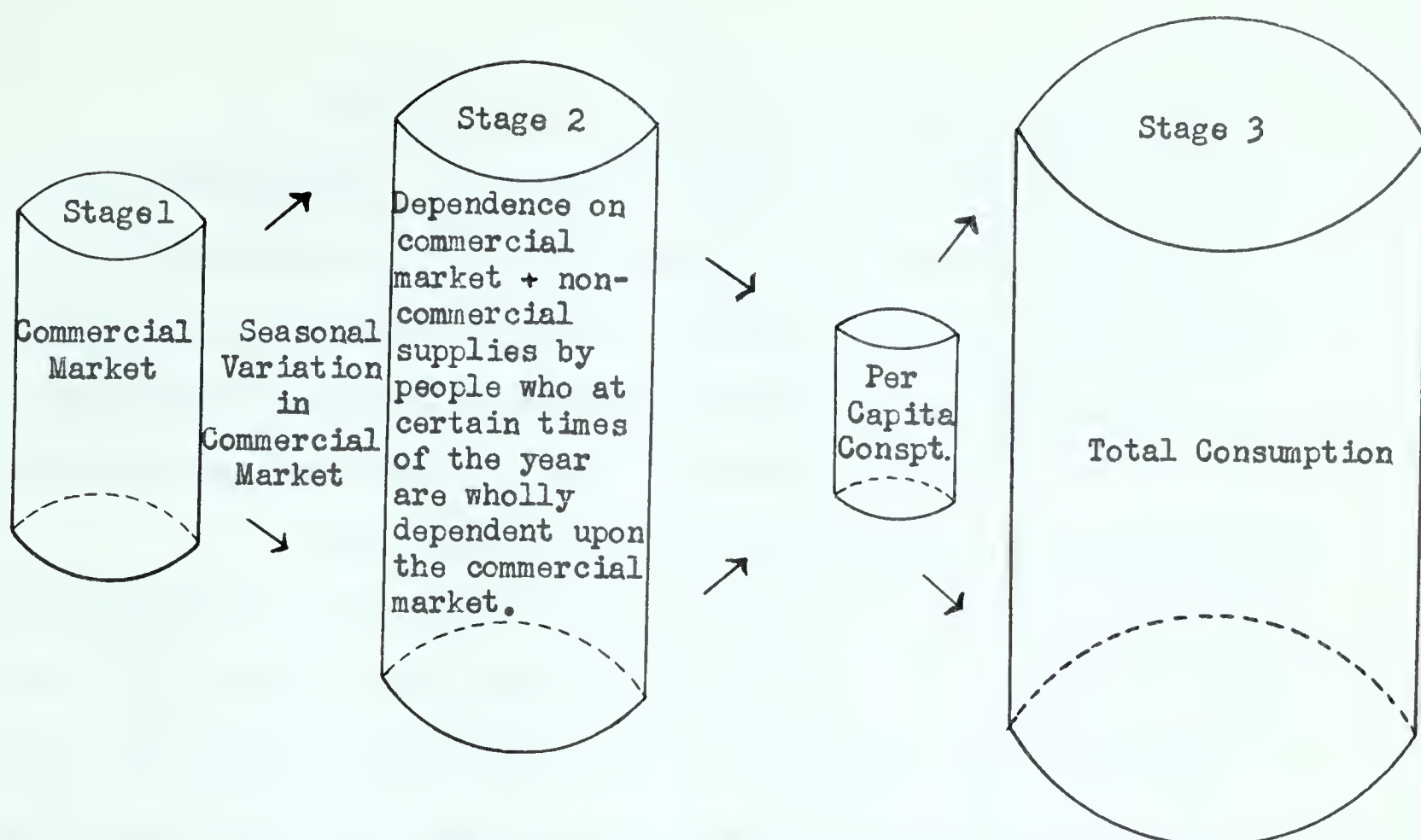


Figure 2.- Stages in the Measurement of Total Consumption from the Commercial Market.

quantity of each commodity that enters the commercial market on the months in which the largest quantities enter the market we should have a measure of the annual consumption of those people who are at certain times of the year wholly dependent upon the commercial market.<sup>2</sup>

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<sup>2</sup>For example, the largest quantities of cabbages enter the commercial markets in Western Canada during the months of March, April, May and June. The total quantity that enters the market during this period is 14,638 thousand pounds (or 146,380 cwt.), see Table A1 Appendix I. The annual quantity consumed by people who are wholly dependent upon the commercial market during the months March through June is  $12 \times 14,638$  or 43,914 thousand pounds. Assuming that urban

and rural nonfarm people are wholly dependent upon the commercial market March through June, the per capita consumption of cabbage in Western Canada equals  $\frac{43,914}{3,415} = 12.9$  lbs./person. Where 3,415 equals

the average population of Western Canada, 1955-1960, of the urban and rural nonfarm sectors.





In the case of corn the largest quantity enters the market during August. This quantity was taken as representative of the monthly consumption of corn during the "in season" (August and September). The annual consumption of corn was calculated by adding to the quantity consumed "in season" the quantity that entered the market during the other ten months of the year.

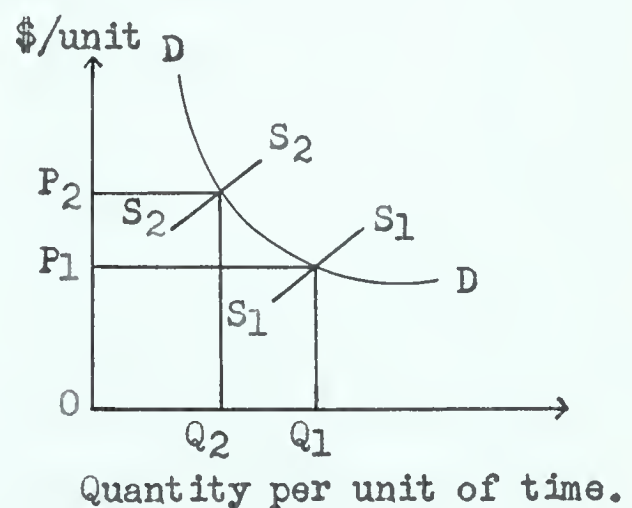
With possibly the exception of corn, the annual quantity that is obtained by the above method should represent a minimum of the annual consumption of the aforementioned people. This should be true, since the months in which the maximum consumption of a commodity should occur are those months in which noncommercial supplies are readily available and prices are low.<sup>3</sup>

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<sup>3</sup>Using cabbage as an example it may be illustrated that individuals consume less during the months in which noncommercial supplies are scarce. In the diagram, shown in the insert at the right, it is assumed that the demand curve  $DD$ , of an individual for cabbage remains stationary over the period of one year. On the other hand, the supply curves of cabbage shift with the seasons.

Thus when cabbages are in season, and commercial and noncommercial supplies are readily available the supply curve of cabbage takes the position of  $S_1S_1$ , and the quantity purchased by the individual is  $OQ_1$  at a price  $P_1$ . On the other hand when cabbages are out of season and

supplies are scarce, especially noncommercial supplies, the supply curve takes the position of  $S_2S_2$  and the individual faced with a higher price  $P_2$  reduces his purchases of cabbage to quantity  $OQ_2$ . (The assumption is made in this example that cabbage is a normal good).







If we are satisfied that we have in stage 2 a measurement of the minimum quantity of the annual consumption of a commodity that is purchased by those people who at certain months in the year are wholly dependent upon the commercial market, then the problem arises of moving from stage 2 to stage 3. In order to do so, per capita consumption values must be calculated from the quantities measured in stage 2. The difficulty in calculating per capita consumption values lies in discovering which sectors of the population are wholly dependent upon the commercial market at certain times in the year. As already indicated, there are very good reasons to believe that different sectors of the population depend in varying degrees upon the commercial market to satisfy their demand for vegetables. Hence, for a commodity such as celery, which is difficult to grow and to store, one may expect that out of season the noncommercial supplies are practically nonexistent, and therefore the entire population during this period is dependent upon the commercial market. Potatoes, on the other hand, are relatively easy to grow and may be stored for periods of six months or more. It is common knowledge that farm families usually grow a quantity of potatoes in excess of their own annual needs. It is also reasonable to assume that when potatoes are out of season rural nonfarm families depend almost exclusively on noncommercial supplies of potatoes by obtaining their supplies either from self supplies or by purchases from local farmers who may offer stored potatoes at a price of one or two cents lower per pound than the price of potatoes offered through the commercial market. Therefore, it seems reasonable to assume that out of season, and when noncommercial supplies are at a minimum, the only sector of population that is wholly dependent upon the commercial market is the urban sector. Fresh corn,



unlike potatoes, is extremely perishable. The "in season" of corn lasts for approximately two months in the prairies and approximately three months in British Columbia. During the remainder of the year supplies of corn are practically nonexistent, hence, the bulk of the consumption takes place when corn is in season. Since corn is easily grown it again seems reasonable to assume that farm and rural non-farm people depend upon noncommercial supplies, while urban people depend almost wholly upon the commercial market.

For commodities such as cabbages, carrots, onions, tomatoes and turnips it is known that considerable quantities are grown in season as self supplies. These vegetables are somewhat more difficult to store than potatoes, and usually they suffer rapid deterioration after a storage period of one to four months. It seems reasonable to make the assumption that farm families depend on self supplies whereas rural nonfarm families and urban families depend upon the commercial market out of season.

To summarize, it would seem the appropriate sectors of the population to use in calculating per capita consumption values from the quantities measured in stage 2 are as follows: celery, the total population; cabbages, carrots, onions, tomatoes and turnips, the urban population plus the rural nonfarm population; and for corn and potatoes the urban population.

One way in which to check the validity of the above assumptions is to compare the per capita consumption values as estimated in this manner with an estimate of the apparent per capita disappearance made by the Dominion Bureau of Statistics. A comparison



between the two estimates is made below in Table I.

Table I. - Estimated per Capita Consumption of Eight Fresh Vegetables:  
A Comparison Between the per Capita Consumption of  
Vegetables in Western Canada and the Apparent per Capita  
Disappearance in Canada.

	: Cabbage: Carrots: Celery: Corn: Onions: Potatoes: Tomatoes: Turnips:							
	pounds per person per year							
1) Canada National Average	10.8	13.1	7.1	3.3	11.8	145.6	17.5	2.9
2) Western Canada	12.9	12.5	7.3	3.0	13.7	122.4	16.2	4.3
Man.	15.0	13.2	6.0	3.1	17.6	132.6	19.2	7.8
Sask.	12.2	6.9	4.8	1.5	8.6	102.3	12.6	1.3
Alta.	13.9	11.0	7.2	2.9	11.7	107.1	16.6	4.2
B. C.	11.4	15.2	9.6	3.4	14.9	132.8	16.0	3.8

Source: 1) Canada National Average estimated from Dominion  
Bureau of Statistics, Five Year Average 1955-1959.  
See Table 2, Appendix III.

2) Western Canada and western provinces estimated  
from Appendix I.

Since the two estimates are based on entirely different sources of data  
and computed by different methods, the closeness of the Canada National  
Average to the per capita consumption estimates made here, lends a  
degree of validity to the measurements attempted in this chapter.





Since the Dominion Bureau of Statistics estimates of per capita consumption were readily available, one may ask why they were not used to calculate total consumption? The reasons are as follows: first, without corroborative evidence, the accuracy of the Dominion Bureau of Statistics estimates are questionable. The per capita disappearance values calculated by the Dominion Bureau of Statistics are calculated from regional estimates of acreages, average yields, and total farm and commercial production. Imports are added to the total production, and exports plus estimates of the quantities used for processing and for nonhuman use are subtracted. Finally, estimated allowances for shrinkage and wastage are subtracted and the apparent domestic disappearance is divided by the total population to arrive at an apparent per capita disappearance.<sup>4</sup> Obviously, this method may entail considerable error. Not only so, but the per capita consumption of fresh vegetables may vary according to regions. And finally, from the Dominion Bureau of Statistics estimates of per capita disappearance, there is no possible way of estimating the size of commercial markets.

Accepting the per capita consumption values in Western Canada and the western provinces as being reliable (Table I) the remaining step in moving from stage 3 is to multiply the per capita consumption of each vegetable by the total population. It should be noted that in moving from stage 2 to stage 3 one more assumption is

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<sup>4</sup>For an example of the calculations used by the Dominion Bureau of Statistics in estimating the apparent Per Capita Disappearance see Appendix III, Table I.



made, and it is that the per capita consumption of each commodity is the same in all sectors of the population. In other words, it is assumed that the per capita consumption of people who reside in urban centres is exactly the same as that of the people who reside on farms. It is questionable that this assumption is valid. Different standards of living, different occupations and differences in the availability of alternative foods all suggest that per capita consumption is not constant among the three sectors of the population. However, lacking concrete evidence to the contrary, the only alternative that we are left with is to assume that the per capita consumption for each commodity is constant. In Table II the total consumption in Western Canada and in each of the western provinces is shown for each vegetable. Other items shown in the Table are the size of the commercial market in each area, a measure of the noncommercial supplies, and the commercial market expressed as a percentage of the total consumption.

The tables that we have been considering are based upon data that have been averaged over a five-year period. Consequently, the estimates of total consumption or of commercial demand, as shown in Table II, are based upon the distribution of the population during the period July 1955 through June 1960. In order to estimate the total consumption, or the commercial demand from Table II in another period, adjustments must be made to account for changes in the distribution of the population.

Unfortunately, the data used in this study are limited to only five years. The data available for the period prior to 1955 are incomplete and not comparable to the data used here. As a result,



Table II. - Total Consumption, Commercial Market, Noncommercial Supplies, and the Percentage of the Commercial Market to the Total Consumption in Western Canada and the Four Western Provinces: Based on a Five Year Average, July 1955 Through June 1960.

: Cabbage : Carrots : Celery : Corn : Onions : Potatoes : Tomatoes : Turnips :									
in 000's of pounds									
Western Canada									
1) Total consumption	57,166	55,394	32,350	13,294	60,712	542,416	71,790	19,055	
2) Commercial market	32,997	34,253	28,132	7,066	42,775	258,414	51,819	12,036	
3) Noncommercial supplies	24,169	21,141	4,218	6,228	17,937	284,002	19,970	7,019	
4) Commercial Market as a percent of total consumption	57.7	61.8	87.0	53.1	70.1	47.6	72.2	64.1	
Manitoba									
1)	13,005	11,444	5,202	2,688	15,259	114,964	16,646	6,763	
2)	9,519	7,973	4,920	1,382	11,404	66,440	11,606	4,383	
3)	3,486	3,471	282	1,306	3,855	48,524	5,040	2,380	
4)	73.1	69.7	94.6	51.4	74.7	57.8	69.7	64.8	
Saskatchewan									
1)	10,854	6,139	4,271	1,334	7,651	91,016	11,210	1,157	
2)	3,821	2,399	3,555	408	4,487	22,748	6,588	457	
3)	7,033	3,740	716	926	3,164	68,268	4,622	700	
4)	35.2	39.1	83.3	30.6	58.6	25.0	58.8	39.5	
Alberta									
1)	16,451	13,019	8,521	3,432	13,847	126,753	19,646	4,971	
2)	7,987	6,994	7,313	1,757	9,377	49,420	13,415	2,718	
3)	8,473	6,025	1,208	1,675	4,470	77,333	6,231	2,253	
4)	48.5	53.7	85.8	51.1	67.7	39.0	68.2	54.6	
British Columbia									
1)	17,001	22,668	14,316	5,070	22,220	198,045	23,861	5,667	
2)	11,679	16,887	12,345	3,518	17,508	119,807	20,211	4,478	
3)	5,322	5,781	1,971	1,552	4,712	78,238	3,650	1,189	
4)	68.7	74.5	86.2	69.4	78.7	60.5	84.7	79.0	

Source: Appendix I.





the period for which the data are used is so short that one is unable to discern any trends. However, annual variations were noticeable and to mitigate the influence of these variations the values in all the tables, unless otherwise stated, were based on the average of five years.

It is obvious no doubt, that changes in the commercial market depend in part upon changes in the population. To be more precise, growth in the commercial market, other things remaining the same, depends upon: 1) growth in the total population; and 2) an increase in the urban population relative to the total population. Growth in the total population that is uniform in all sectors naturally means a larger total consumption and a larger commercial market, since there are that many more mouths to feed. If the growth occurs only in the urban sector at a loss to the other sectors of the total population, or, in the more realistic case, if growth occurs in the urban sector at a more rapid rate than in other sectors of the population, it follows that the commercial market will grow at a faster rate than the rate of growth in the total population. This is so, because as people shift from the farm and rural nonfarm sectors into the urban sector they become more dependent upon the commercial market.

Such changes in population have been taking place in Western Canada during the past thirty years. In Figure 3, growth in the total population and changes in the proportions of the three sectors are shown plotted on a semi-logarithmic scale. In the main diagram the dark lines represent the measured population at different periods in time as measured by the Dominion Bureau of Statistics.





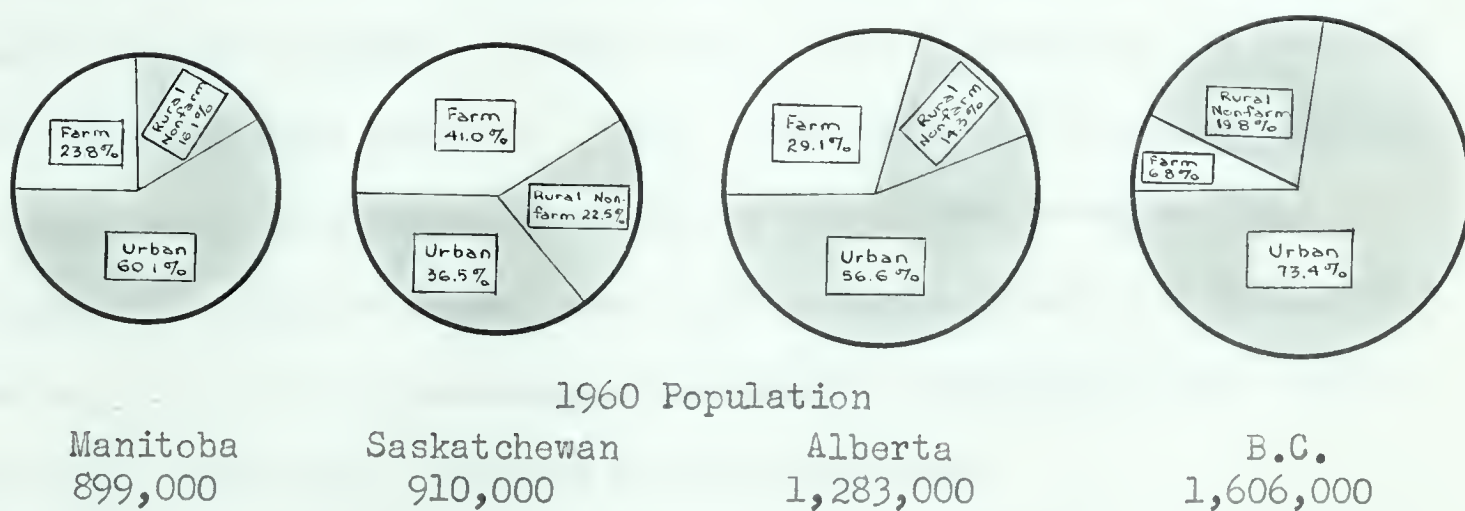
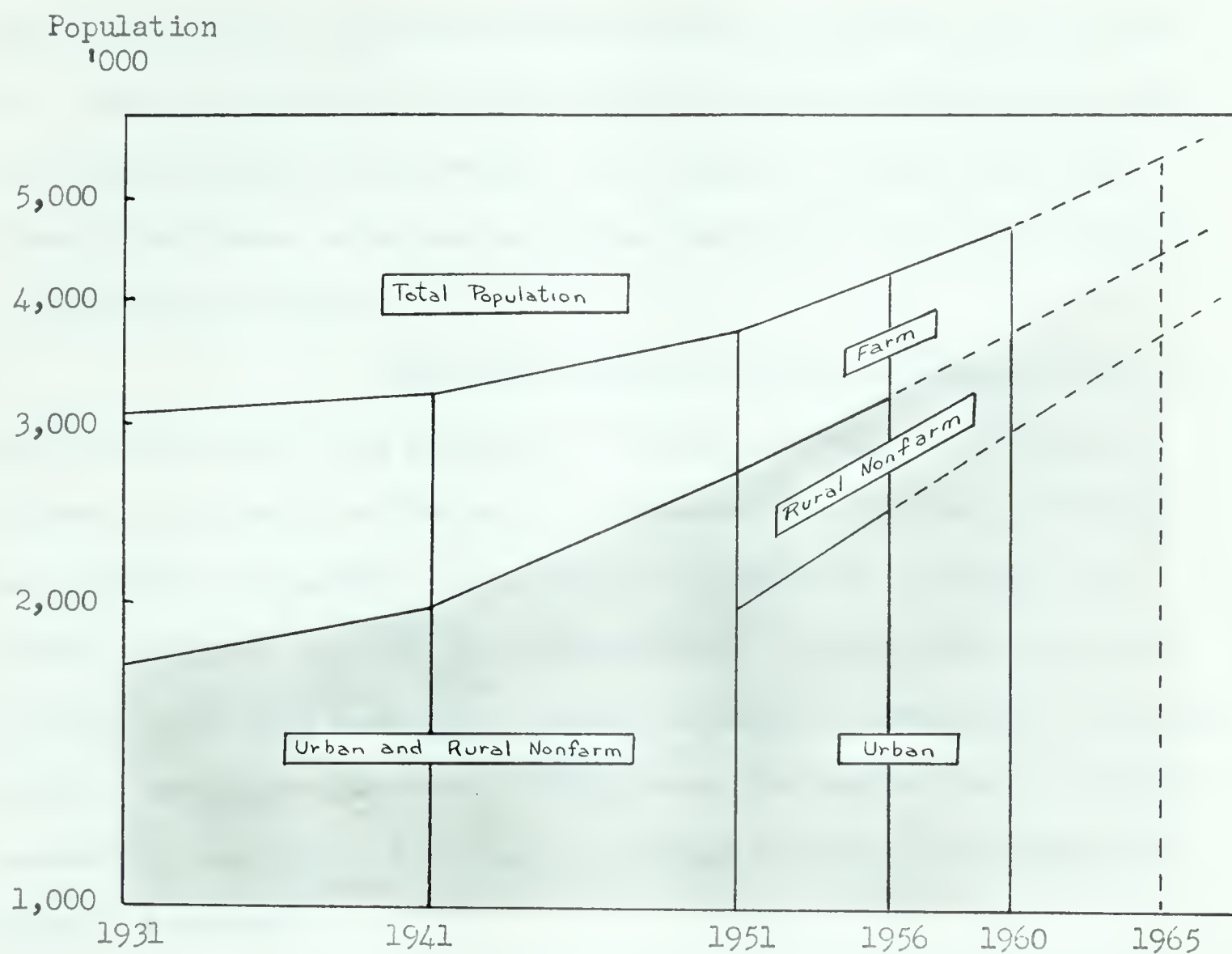
The dotted lines are projections of the population, from the period 1951 through 1960 in the case of the total population, and 1951 through 1956 in case of the populations contained in the three sectors, farm, rural nonfarm and urban. The urban and rural nonfarm sectors were not defined by the Dominion Bureau of Statistics until 1951, so prior to that year we have no separate measures of the two sectors. The pie graphs at the bottom indicate the size of the population in each of the western provinces with the percentages of the sectors based on the 1956 Canada Census.

The growth in the total population in Western Canada during the period 1931 through 1960 has been increasing at a rate faster than a constant percentage, as shown by the upward curvature of the trend line representing total population. In units of people, the population in Western Canada increased from slightly over 3.0 million in 1931 to 3.17 million in 1951 and then increased rapidly to 4.7 million people by 1960. This growth in total population was accompanied by a very definite shift in the population from the farm sector into the urban and rural nonfarm sectors. Indeed, the trend based on the short period of 1951 to 1956 indicates that population from the rural nonfarm sector is shifting into the urban sector.

This rapid growth in the total population, especially since 1951, and the rapid shift to urbanization beginning as early as 1941 has undoubtedly had a tremendous impact upon the size of the commercial market. Unfortunately, data are not available for a sufficiently long period to measure the effect of this. But, relying



Figure 3.- Farm, Rural Nonfarm, and Urban Population in Western Canada, 1931 to 1960 and Estimated to 1965.



Source: Estimated from Canada Census, 1956 and Intercensal Estimates by the Dominion Bureau of Statistics.



on our knowledge of the dependence of different sectors of the population upon the commercial market we know that the commercial market has been expanding, and probably will continue to expand for some time in the future, at a rate somewhat greater than the rate of growth in the total population.

Two other factors should be considered when we speak of the size of the commercial market and these are changes in income and changes in the prices of commodities that are substitutes to a specific commodity. As a result of an expanding commercial market technical innovations and economies of scale may occur in the chain of marketing such that a wider selection of commodities, at lower prices, are offered for sale. In this case, the market for the specific commodity may grow at a relatively slower rate than the commercial market in general.

The other factor that may affect the size of the market of a specific commodity is a change in incomes. The only clear case in which rising incomes have affected the size of the commercial market for the vegetables under study is that of potatoes. In this case the effect has been negative. This is illustrated by a downward trend in the per capita disappearance values since 1940 through 1960 (a period in which incomes have risen by approximately 91 percent).<sup>5</sup> Hence, in the case of potatoes, even though urbanization was taking place at a rapid rate, the size of the commercial

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<sup>5</sup>For the per capita disappearance values see Appendix III, Table 2.

For the percentage increase in incomes, see National Accounts Income and Expenditure, Dominion Bureau of Statistics, Ottawa.







market for potatoes grew at a slightly slower rate due to the decline in the per capita consumption of potatoes. On the other hand, the per capita disappearance of celery shows a slight upward trend during the period 1945-59. In this case the effect of rising incomes has been positive. Hence, with a growing population and rising incomes we may expect a somewhat more rapid growth in the size of the commercial market for celery.

From the above it follows that the prosperity of any group of producers in a given area of supply will in part depend upon the rate at which the commercial market for their product is expanding. Their prosperity will also depend, in part, upon the extent in which they can compete with other areas of supply in maintaining their share of the expanding market, or whether they can increase their share. In the following chapters an assessment is made of the supply of the eight fresh vegetables to the commercial markets of Western Canada and an assessment is made of the competitive position of Alberta growers in supplying this market.



## CHAPTER III

### INTERREGIONAL COMPETITION IN SUPPLY

In Chapter I some of the difficulties encountered in the construction of empirical supply curves and empirical demand curves were pointed out. In the last Chapter, on demand, it was pointed out that due to the fact that a large number of local markets exist in Western Canada, and, because each commodity in fact is not homogeneous, but consists of numerous products that are slightly differentiated according to grade and place of origin, it is impossible to construct demand curves for each of the commodities for the region of Western Canada or for any of the western provinces. Western Canada was referred to as one market area in which prices at different geographic points tend to move in the same direction, but do not necessarily tend to equality. In turn, each of the western provinces was referred to implicitly as a local market, again violating the more restricted definition of a market as an area over which prices tend toward equality.

By the same token, it is impossible to construct empirical supply curves for the whole of Western Canada or the four provinces. It is possible, however, to delineate areas of supply and



to determine which areas have a comparative advantage.

The principle of comparative advantage underlies the pattern of interregional competition. In general terms this principle states that each area tends to produce those products for which it has some distinct advantage as compared with other areas. The advantage may be the result of only one factor, or it may arise from a combination of any number of factors. Thus, an abundance of natural resources, fertile land, and suitable climate may give one region a distinct advantage over another in the production of certain commodities. The proximity of the area to its market, the size of the market, transportation costs and storage costs must also be taken into account when one considers the comparative advantage of two or more areas of supply.

The principle of comparative advantage does not in any way suggest that supply can only come from specific areas. The very fact that production costs and distribution costs may partially substitute for one another gives a large measure of flexibility in respect to the areas of supply. This fact becomes more evident later in this study. A relatively constant demand exists for the eight fresh vegetables under study. Seasonal variation occurs in the supply of these vegetables with the peak supply coming from different production areas at different periods. This is clear evidence that the comparative advantage of one area of supply in relation to another area of supply changes with the seasons.

The problem at hand, then, is to determine for each commodity the areas of supply that have a dominant share of the commercial market in Western Canada. In particular, what is Alberta's competitive position as an area of supply in this market? Is Alberta's





share of the commercial market likely to increase, decrease, or remain constant? When converted to acreages, is Alberta's share of the commercial market large enough to encourage specialization amongst the vegetable producers in this province?

These questions can be answered at least partially by determining which areas of supply have the comparative advantage in selling produce in Western Canada during different seasons. However, before doing so, some of the factors that give one area of supply an advantage over another should be mentioned. The various approaches that may be used in determining comparative advantage should also be discussed.

In assessing the comparative advantage of different regions the simplest approach is to group areas according to the suitability of the environment to the production of the particular commodities. This is similar to the "Principle of Specialization", referred to by Mighell and Black in which they state, "Each area tends to produce only a few things - frequently only one - and to sell its surplus of these and with the proceeds buy other things that it needs."<sup>1</sup> It is known that different vegetables respond in growth and yield to certain environmental conditions. Some vegetables require a long frost-free period, other vegetables respond favorably to high humidity and short

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<sup>1</sup>Ronald L. Mighell and John D. Black, Inter-regional Competition in Agriculture, Cambridge 1951. In this book the authors state the Principle of Specialization, (page 14), but attribute its origin to Adam Smith and to the economists of his period. Adam Smith in his book, Wealth of Nations, London, 1776, recognized that there is an advantage of producing particular commodities, wholly or chiefly in the countries most naturally fitted for their production, Book IV, page 423.



days, other vegetables respond most favorably to cool temperatures and long days, and so on.

To determine the comparative advantage of different areas, solely on the basis of environmental conditions is hardly satisfactory. We know that many vegetables can be grown under a certain range of environmental conditions, and that the yields and quality of certain vegetables do not vary to any appreciable extent within this range. Consideration of the environmental conditions of each area is not enough. We must also consider whether or not each vegetable is adaptable to transport and storage. We know that some vegetables are extremely perishable, such as sweet corn. Other vegetables present problems in packing and transporting. Such is the case for tomatoes and celery which have to be placed in special crates to prevent bruising and crushing. Yet other vegetables are relatively non-perishable and can withstand a considerable amount of abuse in handling. Potatoes and turnips are in this category. It is obvious, then, that to determine the comparative advantage of different areas of supply the ease with which the different vegetables may be transported and the storage characteristics of each vegetable must be taken into account. This in turn depends in part on the proximity of the area of supply to the specific market area.

But transportation and the storage of vegetables incur costs. These costs are in addition to the cost of growing the vegetable. Hence, another way in which to assess the comparative advantage of different areas of supply is to compare the costs involved in placing a particular vegetable for sale in a particular market. This



approach has the advantage of including both the influence of the physical characteristics of the vegetable and the effect of the proximity of the supply area to the market.

For the present it is convenient to divide the cost of supplying a market into the costs of production and the cost of distribution. In this division it will be noted that the costs of production are closely related to the growth requirements of the vegetable, and that in turn these are related to the environmental factors of the different areas of supply. On the other hand, costs of distribution are closely related to the physical characteristics of the vegetable such as its handling qualities and its perishability. The factors that make up the costs of production and distribution are elaborated on below, but first it is convenient to obtain a perspective of Western Canada in relation to the areas of supply.

In the map in Figure 4, the market area of Western Canada is delineated by heavy black lines. Each of the western provinces, of course, can be considered as areas of supply since each province to some extent supplies its own markets and in addition may supply neighbouring provinces with certain vegetables. The only other province that supplies an appreciable amount of fresh vegetables to Western Canada is Ontario. The Maritimes have, on occasion, supplied Western Canada with very small quantities of potatoes and turnips. Of the vegetables imported into Western Canada, the states of California, Washington, Oregon, Texas and Florida are the major areas of supply. It is interesting to note that all of these states border along the sea coast. The states of California, Texas





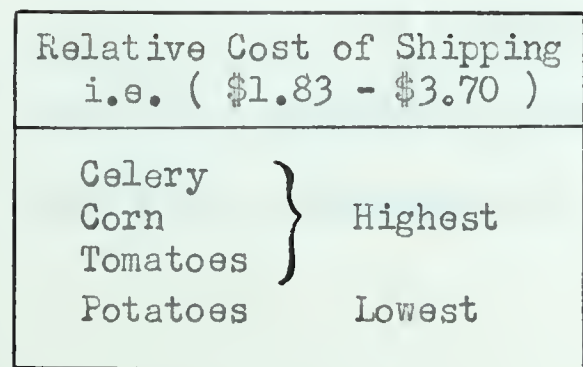


Table of Import Duties U.S.A. into Canada		
Commodity	Seasonal : : duty : \$ / cwt.	Maximum : : duration : in weeks
Cabbage	0.90	30
Carrots	1.00	40
Celery	2.00	24
Corn	1.50	8
Onions	1.50	44
Potatoes	0.37½	52
Tomatoes	1.50	32
Turnips	10% ad valorem	52

Based on rates effective April 1, 1959 to March 31, 1960



and Florida lie in part between 30° and 40° latitude which indicates that in these areas two or three crops may be grown on the same land each year. This is compared to a maximum of one field crop per year in Western Canada.

Included in Figure 4 are the costs of transporting the commodity by rail from the various areas of supply to specific points in Western Canada. A range is shown in the cost of transportation because the rate is different for different classes of vegetables. This is partially due to the perishability of the commodity and partially due to the value of the commodity. Hence, for vegetables such as corn, tomatoes, and celery, that require special handling and refrigeration the freight rates are higher than for vegetables such as potatoes and turnips. It is also interesting to note that tapering freight rates and competitive freight rates undoubtedly have an influence upon the movement of vegetables to, and within, Western Canada. For example, it should be noted that the freight rate from Vancouver to Winnipeg is lower than the aggregate of the rates from Southern Alberta to Vancouver plus the rate from southern Alberta to Winnipeg. One example of the effect of competition (although not important in this case) is the difference in the rates between Florida and Winnipeg, and Florida and Vancouver. The latter is the lower rate because the railroads are said to compete with ships via the Panama Canal.

During the relatively short period of 5 years, 1955 through 1959, it is estimated that of the total volume of fruits and vegetables unloaded in Western Canada, the volume unloaded by trucks has increased from 37.2 percent in 1955 to 52.9 percent



in 1959.<sup>2</sup>

The influence of truck competition upon the railroads has forced freight rates for a few specific commodities downward during this period. Currently, truck rates range from 5 cents to 15 cents per hundredweight below the rail freight rates on hauls from Southern Alberta to Winnipeg or to Vancouver, the amount depends upon whether or not the trucker is trying to pick up a return load.

Also shown on page 34 is a table listing the duty in cents per hundredweight that was paid on fresh vegetables in Western Canada during the Period 1959-60. Duties are negotiated every three years. They are negotiated at Geneva and they are the product of the General Agreement on Tariffs and Trade (G. A. T. T.). Usually the tariffs of main concern to two particular countries are negotiated by those countries; the tariffs struck by these two countries then apply to the other member nations. For example, Canada and the United States may negotiate tariffs on the trade of vegetables between the two countries, the tariffs agreed upon are then applicable to other member nations when they trade with United States or Canada.

With the exception of potatoes, turnips and corn, the duty on the fresh vegetables included in this study are specific

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<sup>2</sup>Estimates calculated, from Annual Unload Reports. In 1955, 61.1 percent of the domestic grown fruit and vegetables were moved by truck in Western Canada: 37.2 percent of the imported fruit and vegetables were moved by truck. In 1959, 73.3 percent of the domestic grown fruit and vegetables were moved by truck in Western Canada and 52.9 percent of the imports were moved by truck.







duties that may be applied on a seasonal basis. A specific duty may be applied for only a given number of weeks during the year. In Canada specific duties are applied by the Department of National Revenue at the request of the vegetable industry and with the concurrence of the Department of Agriculture. The "arm" of the industry is the Canadian Horticultural Council which makes the request for specific duties. Hence for vegetables other than corn, potatoes, and turnips, there are seasonal duties that are in effect during a period of 26 to 40 weeks, depending upon the vegetable. The rest of the year these vegetables enter Canada duty free. In the case of potatoes there is a year around duty of 37-1/2 cents per hundredweight. On turnips and corn there is an ad valorem duty of 10 per cent the year around. With the exception of potatoes, turnips and corn, the imposition of duties only deters the entrance of vegetables during the months that vegetable crops in Canada are in season.

To return now to the discussion on the costs of production, it was pointed out above that these costs were closely related to the growth requirements of the vegetable and the environmental factors of the area of supply. There is no need to elaborate on the fact that over the large geographic area that competes in the Western Canadian market, there is a wide range of environmental conditions. In certain areas the environmental conditions are such as to favour the production of certain commodities. But the yield per acre is only one part that affects the costs of production. To grow tomatoes an intensive use of labour is



required. This is also true of celery. The plants of these vegetables are usually started in hotbeds or heated greenhouses. They are transplanted once into cold frames and finally transplanted into the field. During the growing period they require attention that for the most part can only be performed by hand labour. During the harvest season these plants again require intensive use of labour, especially in the case of tomatoes in which the field may be picked through several times before the plants are destroyed. This is in contrast to the production of a crop such as potatoes, which usually requires intensive use of specialized equipment and a relatively small proportion of the total cost in the form of labour when grown on a commercial scale.

The costs of production are derived from the cost of land, labour and capital. In turn the cost of each factor of production is determined by the supply and demand for that factor. If production in a specific area takes place on a large scale internal economies and external diseconomies must be reckoned with. The production costs per unit of produce in any one area are not relative just to the physical productivity of the area, but are also relative to the general level of farm prices and farm wages in that area in the given period of time.

Once the commodity has been produced there remains the additional cost of distributing it to the final users. As previously mentioned, distribution costs are dependent upon the physical characteristics of the vegetables and upon the proximity of the area of supply to the specific market. However, there is



more to distribution than merely transferring a commodity over a geographic area from point A to point B. The commodity also may be transferred through time. Hence when a commodity is transferred over a geographic area costs of transportation are involved, and when it is transferred through time costs of storage are involved. From this it follows that if the costs of production are approximately equal in two areas of supply, the one closer to the specified market area will normally have the comparative advantage during the period the crop is in season.

In the same way, if a commodity is of a type that can be stored from one crop season to the next without excessive deterioration at a cost below that of bringing it in from more distant areas, the supply of that commodity will normally come from the area closest to the market. In other words, the storage characteristics of a vegetable determine to a large extent whether or not the annual supply to a market originates locally. For example, potatoes may be stored six months or more without excessive deterioration. The storage characteristics combined with growing characteristics of this vegetable enable local potato growers in Western Canada to maintain a comparative advantage for at least ten months of the year. On the other hand while cabbages are suitable for the climatic conditions of Western Canada and are consequently relatively easy to produce, they are extremely difficult to store beyond a period of three months without excessive deterioration. As a result, local producers of cabbage in Western Canada maintain a comparative advantage in supplying the market





for only two or three months more than the period in which cabbages are in season.

Two more types of costs must be considered under the general heading of costs of distribution; they are costs of processing and costs of advertising.<sup>3</sup> In the case of both of these costs the preferences of consumers must be reckoned with. The costs of processing may be viewed as adding value to the commodity, but in doing so the commodity is broken down into a number of slightly differentiated products. Thus, washed potatoes may sell in greater volumes through retail stores than unwashed potatoes, even though the latter may have a slight price advantage to the consumer. Similarly, carrots that have been graded, washed, and packaged into attractive polyethylene bags may sell in far greater volumes and at higher prices than the more unattractive bunched carrot. By the same token, brand names and advertisements are used to differentiate the products of one area or agent from those of another. The consumer is conditioned to associating quality in vegetables with a particular name, color, or shape of the package.

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<sup>3</sup>While one may consider these costs to occur after the wholesale firms purchase the commodity, nevertheless these costs have a bearing upon the quantity sold in the retail market. Since the wholesales' demand for the commodity is "derived" from the consumers' demand for the commodity, the costs of processing and advertising have a direct bearing upon the quantities purchased by the wholesale. For an excellent text on theoretical methods of evaluating the efficiency of the "middleman" see William H. Nicholls' Imperfect Competition within the Agricultural Industries, Ames, 1947.



The manner in which advertising and processing affects the comparative advantage of different areas of supply depends upon whether the final products are differentiated according to the area of supply or whether they are differentiated according to the commercial firm that does the processing and advertising. In the latter case the wholesale firm may process and pack a vegetable under a brand name without mentioning the place of origin of the vegetable. In this case, it has been argued, that wholesalers make their purchases of a commodity strictly on the basis of price competition, regardless of the origin of the commodity. The area that has the comparative advantage in supply will then benefit. An example in which advertising and processing increase the sales of a commodity from a specific area of supply, independent of the areas' advantage in cost, is the national advertising campaign carried on by the Idaho Potato and Onion Commission in promoting the sales of Idaho potatoes. In Canada the British Columbia Tree Fruit Growers Association carries on a similar campaign.

The problems involved in assessing the comparative advantage of different areas of supply relative to one market should now be obvious. It is a complex chain of marketing that puts fresh vegetables into retail stores. To assess the comparative advantage of different areas of supply the costs of production and the costs of distribution for each area would have to be calculated and compared. Since it is known that costs of supply from different areas vary according to the season, adjustments or recalculations would have to be performed to account for seasonality. Too, the costs of production and of distribution are in themselves comprised of factor costs as



determined by the supply and demand for the factors, hence an assumption would have to be made that factor costs maintain the same relationships over the period in which the costs are established. It would also be necessary to assume that no changes in technology occur during the period in which costs are observed. Finally, since the comparative advantage of different areas supplying a specific market is far different for each commodity, each commodity would have to be considered separately, or the commodities would have to be grouped according to common physical characteristics of growth and storage.

Some authors in their studies on interregional competition of a particular commodity have delineated competing regions and then proceeded to compute a long run demand curve for the market area and a long run supply curve for each region of supply.<sup>4</sup> On the basis of the calculated supply and demand curves they predicted which region would expand production, when a rise in demand occurred.

For the many reasons already given, no attempt is made in the present study to construct supply curves and demand curves as a means of determining the comparative advantage of the different areas that compete in selling fresh vegetables in Western Canada. Instead, the approach used in this study determines which areas of supply have the comparative advantage as revealed by their respective shares in the market.

Implicit in the approach used here is the assumption that the market for fresh vegetables in Western Canada is perfect, or

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<sup>4</sup>Ronald L. Mighell and John D. Black, op. cit.





nearly perfect, for only in a perfect market will the quantities that enter do so entirely on the basis of lowest costs per unit of comparable quality. However, it is known that the market is not perfect. The different types of vegetables that enter the market are not homogeneous within themselves. They are differentiated according to variety, quality, type of pack and place of origin. Yet, the degree of differentiation that exists is only slight. For the most part grade 2 potatoes are a close substitute for grade 1 potatoes, local grown potatoes are almost perfect substitutes for potatoes grown in Idaho, and the potato in Packer A's fancy pack is almost a perfect substitute for the potato in Packer B's fancy pack. Nor is it apparent that any one wholesale firm, will seek the major volume of its supplies on criteria other than the lowest cost per unit for comparable quality. As a consequence, while the market for fresh vegetables is not perfect, it must be deemed nearly perfect. The area of supply that holds the dominant share of the market during any particular season must do so because it can supply the market at the lowest cost.

In the following chapter the shares held by the different areas of supply in the Western Provinces have been ascertained for each of the eight commodities. From these shares the comparative advantage of Alberta as an area of supply to the four Western Provinces is discussed in relation to other areas of supply.



## CHAPTER IV

### THE COMPETITIVE POSITION OF ALBERTA GROWERS IN WESTERN CANADA

In the previous chapter it was pointed out that the comparative advantages of different areas of supply relative to a specific market were determined on the basis of lowest costs. These costs, it was stated, can be classified as costs of production and costs of distribution. One of the items that influence the costs of production is the growth characteristics of the vegetable: one of the items that influence the costs of distribution is the storability of the vegetable. The appropriate starting point, then, in assessing the comparative advantage of Alberta as an area of supply to the Western Canadian market is to consider the physical characteristics of the vegetables.

Accordingly, the fresh vegetables in question have been divided into three groups. These groups are as follows:

Group I consists of vegetables that are well adapted to the climate of Western Canada and capable of being stored from the end of one crop season until the beginning of the next. Included in this group are potatoes and turnips.



Group II, consists of vegetables that are moderately well adapted to the climatic conditions in Western Canada, but are difficult to store. Included in this group are: corn, cabbages, carrots, and onions.

Group III, consists of vegetables that are relatively costly to produce on a commercial scale in Western Canada and which are difficult to store. Included in this group are celery and tomatoes.

The market situation, as it exists for each of these groups, will be discussed in turn.

#### GROUP I

The vegetables included in this group are potatoes and turnips. These vegetables are well adapted to the environmental conditions in nearly all parts of Western Canada. They are commonly grown as field vegetables. Little difficulty is encountered in growing them on a commercial scale.

In Alberta the annual commercial acreage of potatoes for the five-year period 1955 through 1959 has been estimated at 9,400 acres.<sup>1</sup> During the nine-year period 1951 through 1959 the commercial acreage of potatoes in Alberta has increased from 7,473 acres to 11,676 acres. Approximately two-thirds of this acreage is located in the irrigation districts. During the same period, the

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<sup>1</sup>Commercial acreages estimated from the Annual Report of the Department of Agriculture of the Province of Alberta, Queen's Printer, Edmonton.





number of commercial growers has decreased from 771 in 1951 to only 442 in 1959. This is an indication of the growth and the specialization that has occurred within the potato industry in Alberta during the last decade. While the capital requirements to start production on a small scale are not high, many of the growers within the province have specialized to the extent that they have 10 to 30 thousand dollars in special seeding and harvesting equipment, plus an additional 5 to 50 thousand dollars in the form of root cellars, washing plants and grading equipment.

The commercial production of turnips in Western Canada is of much less importance. In Alberta the annual commercial acreage for the five-year period was estimated at approximately 400 acres, over half of which was in irrigation projects.<sup>2</sup> As far as can be ascertained, the production of turnips within Alberta has remained as a secondary enterprise on farms specialized in vegetable production.

The relationships between the physical characteristics of these vegetables and the commercial market are shown in Figures 5 and 6. In these figures, the graphs represent the wholesale price of domestic grown produce sold in the western provinces. The prices used in the construction of the graphs represent an average of all grades and all kinds of vegetables, respectively. The prices are based on a five-year average, July 1955 through June 1960.<sup>3</sup>

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<sup>2</sup>Estimate made by personnel of the Canada Research Station at Lethbridge.

<sup>3</sup>Prices calculated from Crop and Seasonal Price Summaries, Canada Department of Agriculture, Ottawa.



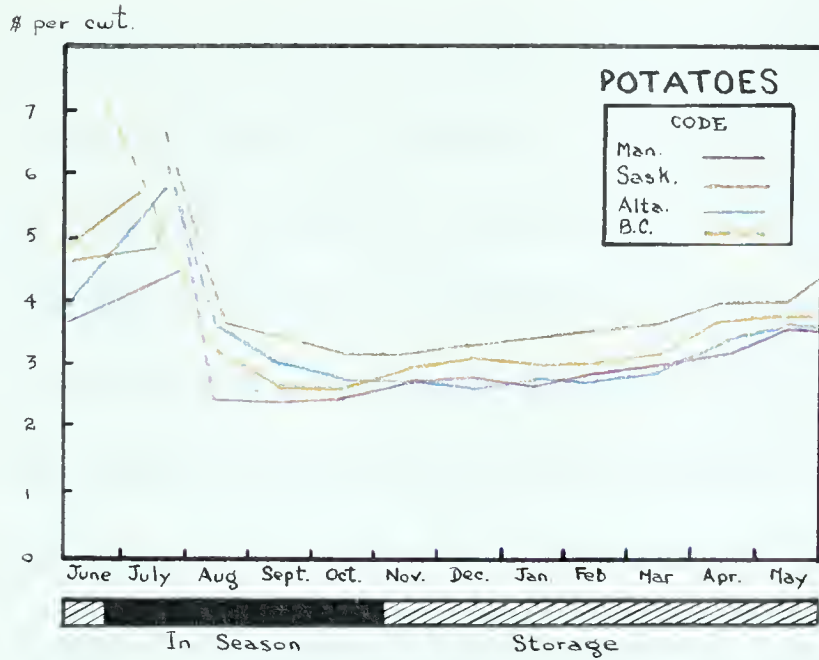


Figure 5.- Prices of Domestic Grown Potatoes at Wholesales in Western Canada, July 1955 through June 1960.

The length of the bar chart below the graph shows the approximate period of time that produce grown in Western Canada goes "on" to the market. The shaded area represents the period in which the vegetable is grown in

Western Canada and the striped area shows the length of time the vegetable is stored for purposes of sale in the commercial market.

It will be noted that seasonal trends in prices are common to both vegetables. At the beginning of the harvest season the prices are exceptionally high. As the season advances the supplies increase and the prices decrease. Once the supplies go into storage there is a gradual rise in prices until the end of storage. This rise in prices is explainable in part by a decrease in supply and the

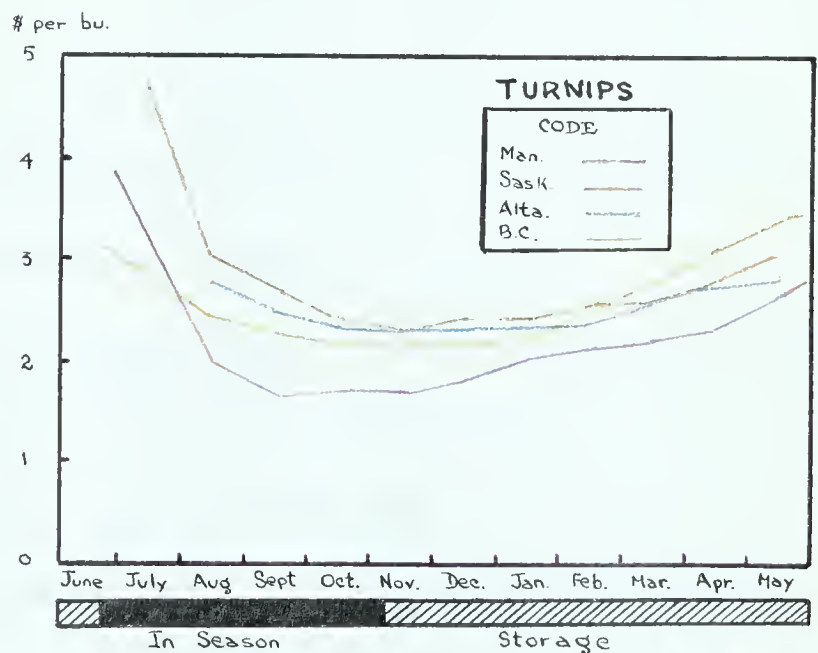


Figure 6.- Prices of Domestic Grown Turnips at Wholesales in Western Canada, July 1955 through June 1960.



increase in the cost of storage over time.<sup>4</sup> It was mentioned in Chapter II and is worthy of reiteration here, that the largest quantities of potatoes enter the commercial market during the months of June and July. This is a period in which the prices of potatoes are the highest during the course of the year and, as shown below, a time in which the largest proportion of the potatoes entering the market are imported from the United States. The foregoing merely emphasizes that "in season" local growers are not only competing with other commercial growers for the consumer's dollar, but in essence, they are competing with the numerous family gardens as well. A similar situation occurs in the case of turnips, but not to such a marked extent. One other point that should be noted at this stage but is not elaborated upon until later, is that the lowest prices occur in the province of Manitoba, and this is true of all the vegetables in question, with the exception of celery and possibly corn.

In Charts 1 and 1A the entry of potatoes from the different areas of supply into the commercial markets of the four western provinces is shown in terms of their percentage importance. The percentages are based upon the total quantities that have been observed to enter the commercial markets each month at the existing wholesale prices during the five-year period July 1955 through June 1960. The charts, therefore, depict the share of the commercial market in each

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<sup>4</sup>Theoretically, it could be argued that the rise in prices is attributed to the cost of storage. This argument, however, would have to be based on the assumption that the market was perfectly competitive and other things remaining unchanged.



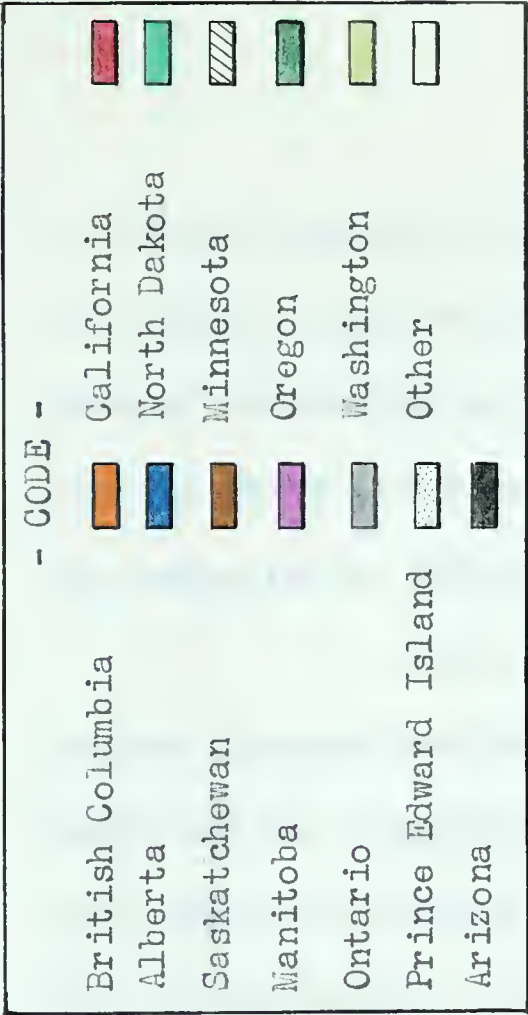




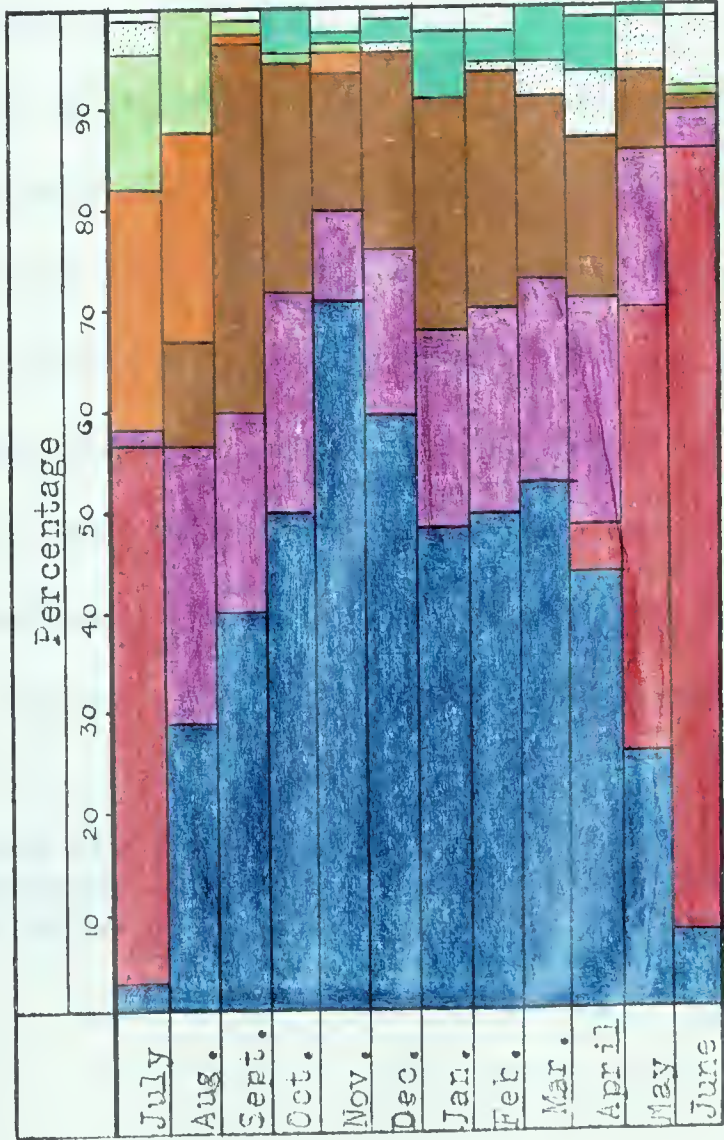




Chart 1A.- The percentage of Potatoes from different areas of supply that each month enter the commercial markets in western Canada. Based on a five year average, July 1955 through June 1960.



SASKATCHEWAN



MANITOBA

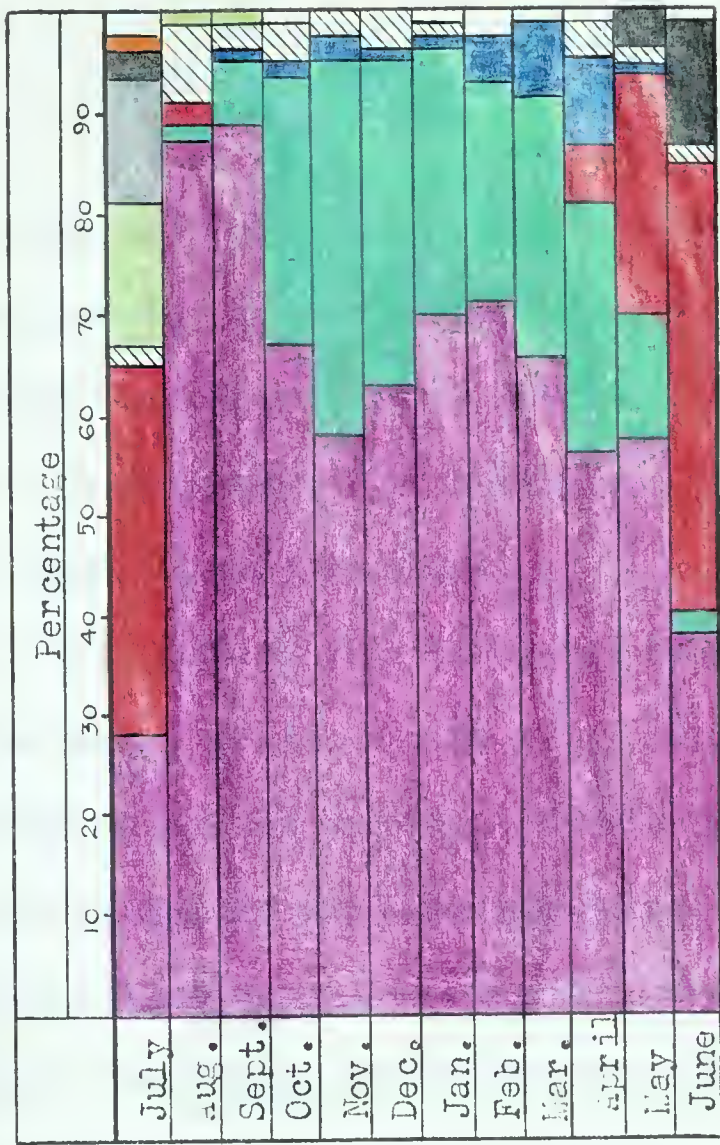




Figure 1.1: The ageing population

Figure 1.2: The ageing population

Year	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
Population aged 65 and over	7	8	9	10	11	12	13	15	17	19	20
Population aged 65 and over as a percentage of total population	7	8	9	10	11	12	13	15	17	19	20
Population aged 65 and over as a percentage of total population	7	8	9	10	11	12	13	15	17	19	20
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Population aged 65 and over as a percentage of total population	7	8	9	10	11	12	13	15	17	19	20

Source: United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects 2019, Chapter 1.1, Figure 1.1.1. Available at: <https://population.un.org/wpp/Charts/>



of the four western provinces that was held by the different areas of supply during the given time period. From this, we may also deduce that during any one month the area of supply that held the largest share of a market must in that particular month have held the comparative advantage in supplying that market.

From Chart I, it is obvious that during the months August through May the Alberta potato growers almost completely dominate the commercial market within the province. From this, one may conclude that during these months the local producers have an advantage in selling their potatoes in the Alberta market area. By making the assumption that during this period the quality of potatoes grown in Alberta is equal to the quality of potatoes grown elsewhere, it follows that the advantage of the Alberta potato growers in the provincial market must be the result of lower costs of production or lower costs of distributing their potatoes to the consumer, or both. If the assumption is made that potato producers are perfectly competitive in their own provincial markets, then the prices of potatoes in each provincial market should reflect the costs of production of local grown potatoes.<sup>5</sup> In Figure 5, the level of wholesale prices of potatoes in Alberta and Manitoba are very similar, indicating that production costs in the two provinces should be approximately the same. By the same token, the cost of producing

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<sup>5</sup>The wholesale price will also reflect the cost of delivering potatoes to the wholesale, but in as much that the producers are perfectly competitive the price will reflect only the delivery costs of the nearby producers.





potatoes in British Columbia and in Saskatchewan should be slightly higher. The main advantage of the Alberta growers in supplying the Alberta market, then, is in lower costs of transporting their produce to the market.

The corollary, of course, is that local markets are most easily captured by the local producers, who, in effect, have a locational advantage when transportation costs are considerable, as they are for potatoes. This supposition is substantiated by Charts 1 and 1A in which it is shown that during the period August through April over 60 per cent of the potatoes that entered the commercial markets in British Columbia, Alberta, and Manitoba, originated from areas within the respective provinces. The one exception is the province of Saskatchewan and this case is elaborated upon below.

From Chart I it is seen that during the period August through April over 95 per cent of the supplies entering the commercial market in Alberta originate from within the province. In turn, this means that during the given period Alberta producers cannot expect to increase the quantity of potatoes they sell in Alberta to any great extent by obtaining a larger share of the Alberta market. Instead they must rely on an increase in the size of the commercial market in the province that will occur, in the main, as a result of a growth in the population and a greater degree of urbanization. Accordingly, for Alberta growers to increase their sales of potatoes in the near future by any substantial amount they must increase their share of the other provincial



markets.<sup>6</sup>

Perhaps the only province in which Alberta could enlarge its present share of the market is British Columbia. As illustrated in Chart I, Alberta supplies less than 5 per cent of the commercial market in British Columbia during the period August through April. Local growers in British Columbia have retained a share of about 60 per cent of the market. If this continues it means that the remaining 40 per cent will be supplied from other areas. The competition that Alberta must face in that province is from the supplies that are imported from Washington, Oregon, and other areas in the United States. On the basis of costs of delivery, Washington has about 10 cents per hundredweight advantage over Alberta, (see map page 34). It is likely that Alberta could only increase its supply to British Columbia at the expense of Oregon, California, and other states.

Alberta's share of the Saskatchewan market during the nine months, August through April, has been approximately 45 per cent. In the near future, Alberta's share of this market is likely to decrease. The reason for this is that during the crop year 1960-61 the commercial production of potatoes in Saskatchewan increased by

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<sup>6</sup>It seems extremely unlikely that in the near future Alberta grown fresh vegetables will be exported in any large quantities into the United States. Aside from import duties and restrictions placed upon the entry of fresh fruits and vegetables into the United States, the distance of large urban centres from the supply areas of Alberta make such a movement unlikely. Of the larger centres which are relatively close to Alberta, one may cite Seattle, or Salt Lake City. Obviously, there are areas of supply within the United States that are capable of supplying these centres with vegetables at a lower cost.



approximately 400 acres. Also in the near future, the development of the irrigated lands in Saskatchewan may increase the total quantities of vegetables grown in that province. A continuation of urbanization in Saskatchewan may also provide a stimulus for an increase in the local production of fresh vegetables. All of which is likely to decrease the share of the market that Alberta currently holds in that province.

Alberta's share of the Manitoba market is less than 5 per cent. Clearly, during the months August through April Manitoba and North Dakota both have a comparative advantage in supplying the Provincial market. (North Dakota delivers potatoes to Winnipeg at approximately 5 to 10 cents a hundredweight below Alberta). In the near future Alberta's share of the Manitoba market is not likely to increase. This is especially so if Saskatchewan obtains more of its potatoes from local supplies. A situation of this sort would have repercussions in the Manitoba market which could possibly give rise to Manitoba producers storing a larger portion of their potato crop and thereby increasing their own share of their provincial market.

So far no mention has been made of Alberta's share of the provincial markets during the months May, June, and July. Turning once again to Chart I it is evident that during these three months California has the dominant share of the Alberta market. In order to explain this phenomenon, it is necessary to abandon the assumption that the quality of Alberta grown potatoes are of the same quality as potatoes from other areas of supply. During this period the supplies that enter the Alberta market from California and British Columbia are new potatoes, which from the consumer's point of view





are undoubtedly a superior product as compared to the somewhat deteriorated potato from the storage supplies of local grown potatoes. Even though new potatoes sell for a much higher price than potatoes from storage, the consumer preference is such that the comparative advantage in supplying the Alberta market shifts to California. Obviously, if Alberta growers are unable to maintain the comparative advantage in supplying their local markets during these three months it can hardly be expected that the same growers could increase their share of the market in the other provinces.

It would appear then, in the case of fresh potatoes, that Alberta as an area of supply may experience some difficulties in maintaining its present share of the Western Canadian market. In the near future one can expect the size of the commercial market in Western Canada to increase as a result of the growth in population and urbanization, and to this extent the quantity of potatoes supplied to the market from Alberta will increase.<sup>7</sup>

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<sup>7</sup>Since the writing of this thesis, it has come to the Author's attention that during the crop year 1960-1961 a plant disease known as net necrosis has become widespread among the potato producing areas of Washington and in the lower mainland of British Columbia. As a result of this disease a large proportion of the potatoes grown in those areas have been diverted from the Vancouver market and in some cases from the fresh trade entirely. The incidence of disease in any one area of supply can of course shift the comparative advantage quite abruptly to other areas of supply. In the situation that is cited, Alberta will undoubtedly increase its share of British Columbia market, although this increase may be temporary, pending the control of the disease in Washington and British Columbia.



Most of what has been said of potatoes can be said of turnips also. But in the case of turnips there is one slight difference. The fact that storage turnips move into Western Canada from Prince Edward Island suggests that local production of turnips in Western Canada could expand. In the Alberta market, Chart 2, it is shown that during the months April, May and June, approximately 38 per cent of the turnips entering the Alberta market originate in Prince Edward Island. Expressed in absolute amounts this represents approximately 1,725 hundredweight or approximately 4 carlots per year.

On the basis of Charts 2 and 2A it seems reasonable that Alberta could increase its share of the turnip market in Western Canada, by replacing Prince Edward Island as an area of supply. In other respects it is apparent that Alberta cannot increase its share of the Western Canadian market to any great extent.

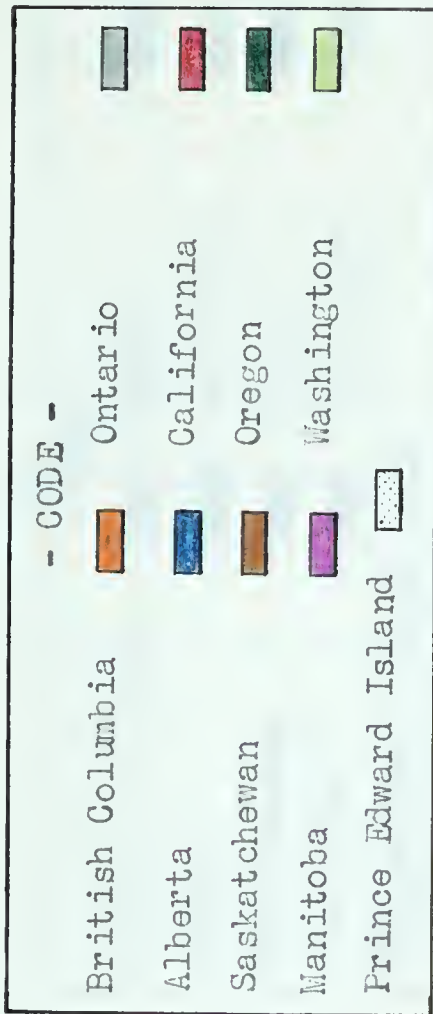
## GROUP II

Included in this group are corn, cabbages, carrots and onions. These vegetables are distinguished from those in Group I primarily on the basis of their storability, although they are more difficult to produce on a commercial scale than either potatoes or turnips. On a commercial scale corn and carrots are generally seeded directly into the field or "field planted". On the other hand, cabbages and onions may be grown from either "field plantings" or from transplants. Both of these methods are used to produce cabbages and onions in Western Canada. When these vegetables are sown

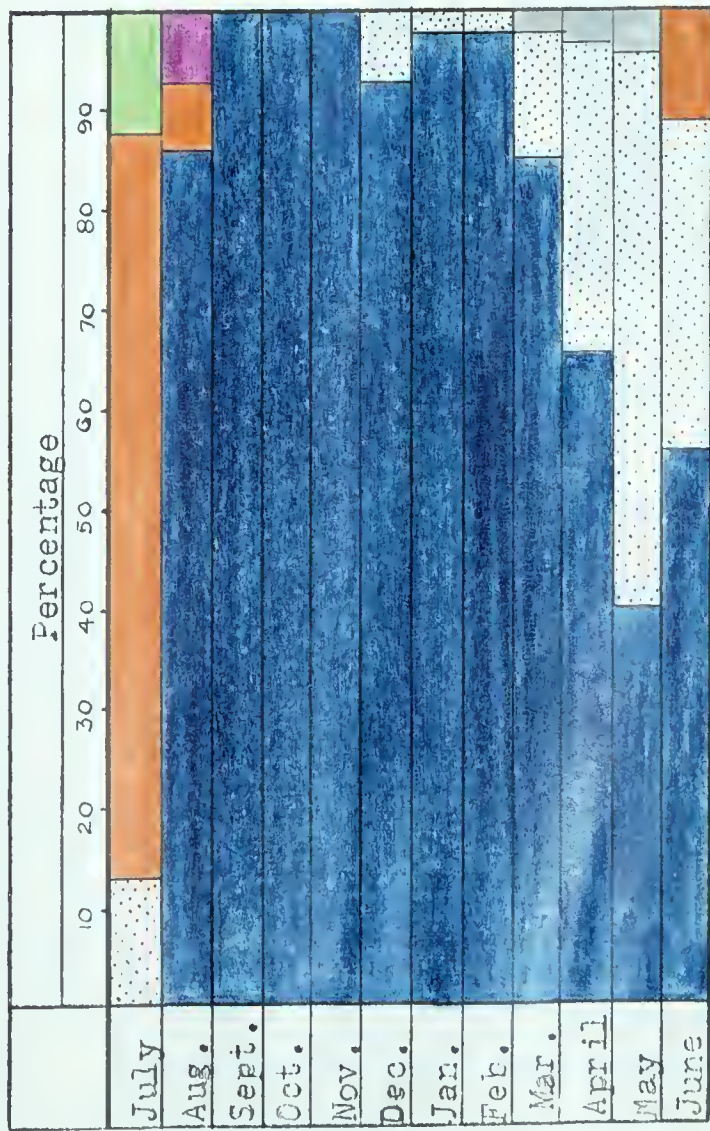




Chart 2.- The percentage of Turnips from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.



ALBERTA



BRITISH COLUMBIA

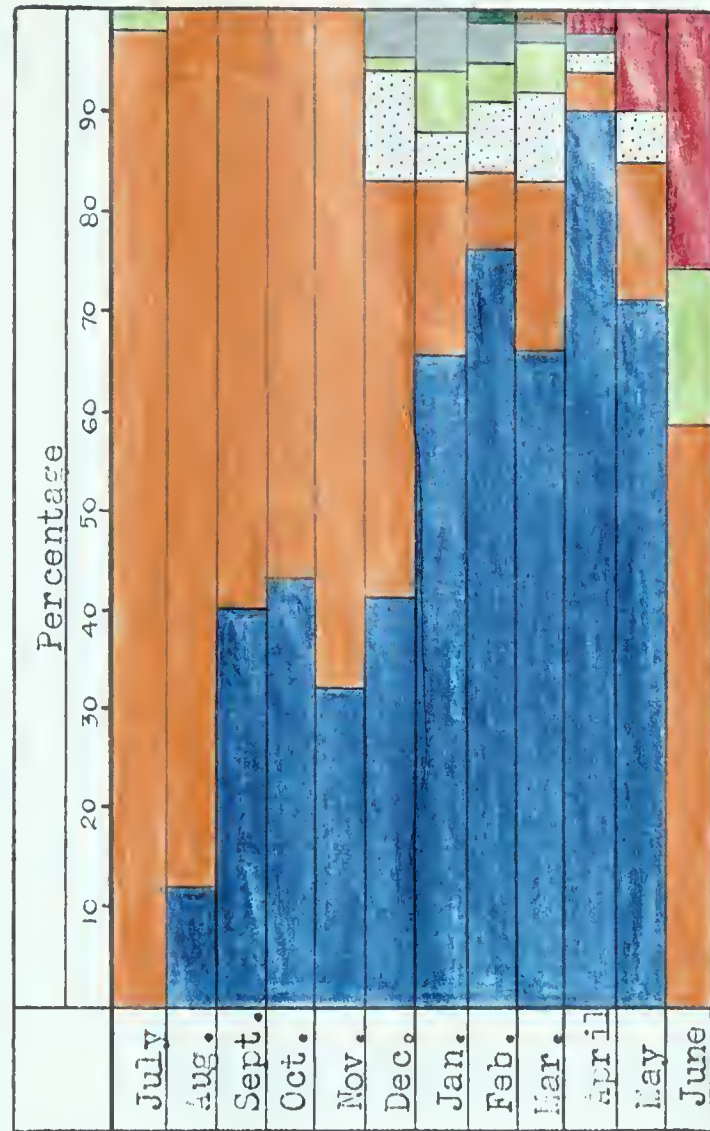
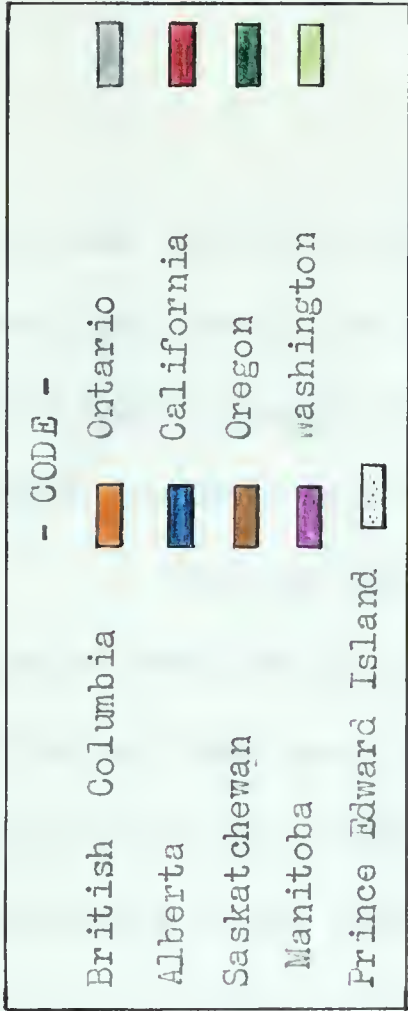


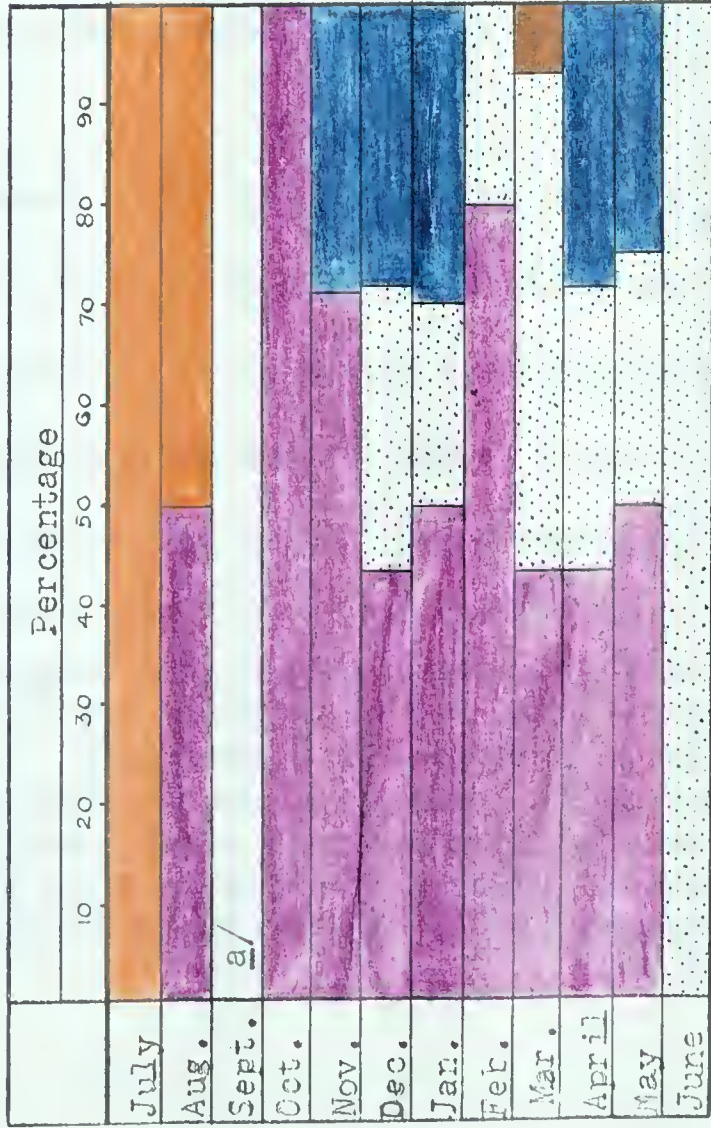




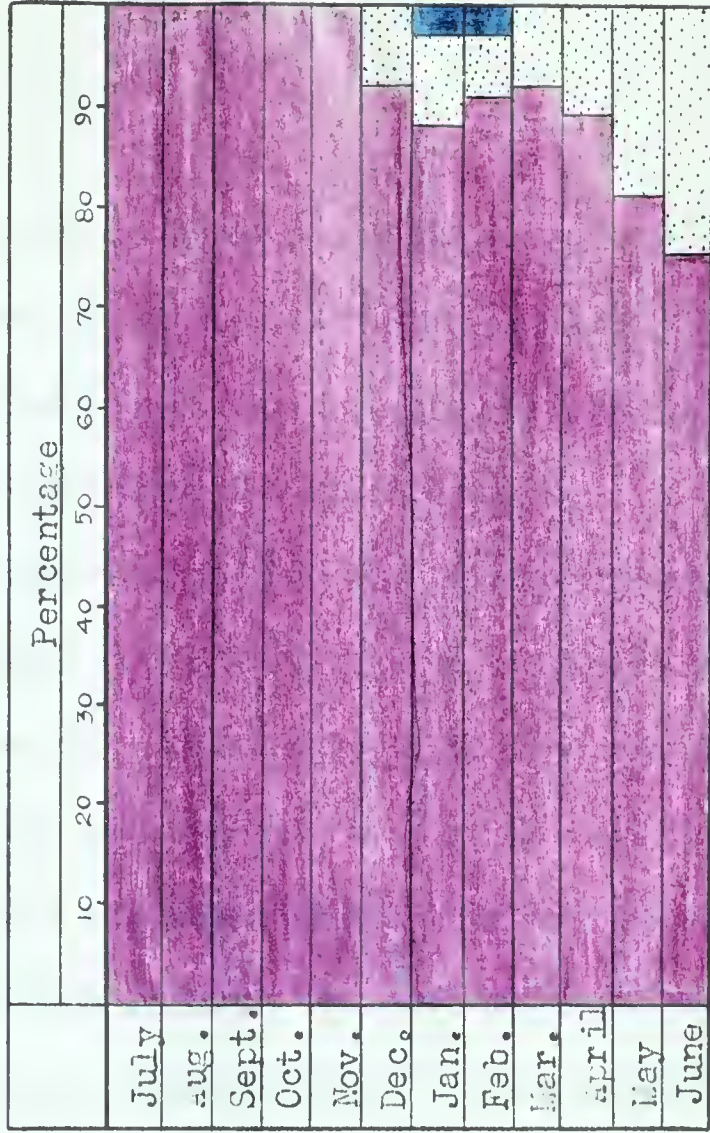
Chart 2A.- The percentage of Turnips from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.



SASKATCHEWAN



MANITOBA



a/ Less than one per cent of the annual supply of Turnips entered the Saskatchewan market during the month of Sept.



directly into the field a saving of labour costs is made as well as in the costs involved in the operation of green houses and hotbeds. On the other hand, plants that are grown from transplants mature two to four weeks earlier than those seeded directly into the field.

Of the four vegetables included in this group, fresh corn is the most perishable. Under ideal conditions corn in the fresh state cannot be held for more than 14 days. As a consequence the actual quantity of fresh corn that enters the commercial market is very seasonal, the peak being in the months August and September. On the other hand, onions are the least perishable of this group. Onions may be stored, without excessive deterioration, for approximately 7 to 8 months. Cabbages commence to deteriorate quite rapidly after 2 months and carrots after 3 months of storage. The deterioration of these two commodities is reflected in the wholesale prices as shown in Figures 8 and 9, respectively.

Seasonality is evident in the Charts 3 - 3A through 6 - 6A. In the case of corn, the pattern of supply in Western Canada is what one would expect. The perishability of corn is such that special precautions must be taken when corn is transported for any distances requiring more than three or four hours of travelling time.<sup>9</sup> Such precautions

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<sup>(9)</sup>When corn is shipped over long distances such as from California to Edmonton, the corn is precooled to 33° - 34° F almost immediately after it has been picked. The corn is then packed in ice and shipped to the destination in refrigerated cars or trucks. When corn is shipped from Southern Alberta to Edmonton a common method is to pick the corn during the night when the air temperature is cool. The corn is then loosely packed in a truck and delivered before the heat of the day settles in.





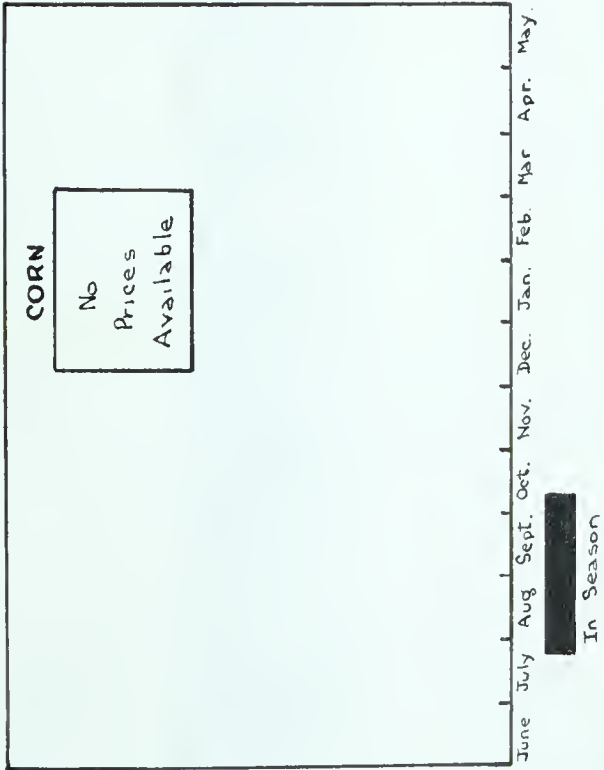


Figure 7.- Prices of Domestic Grown Corn at Wholesales in Western Canada, July 1955 through June 1960.

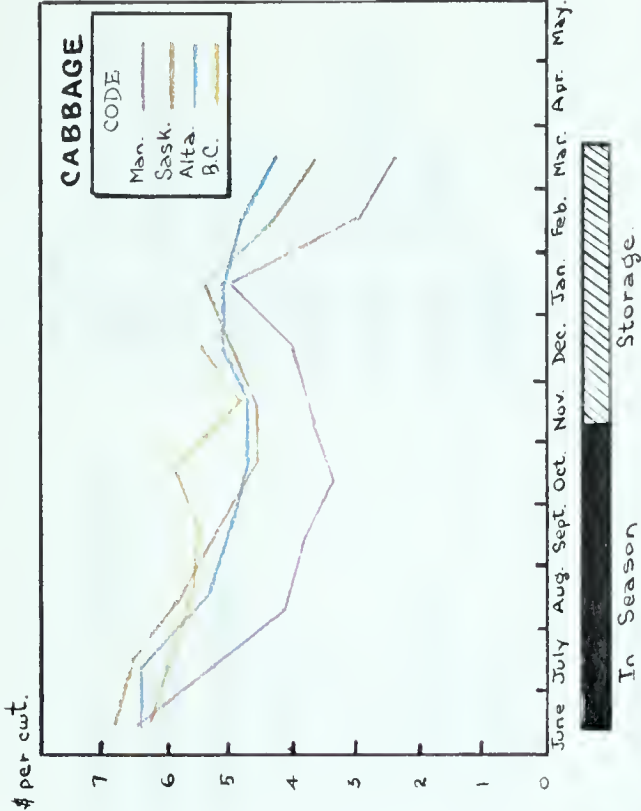


Figure 8.- Prices of Domestic Grown Cabbage at Wholesales in Western Canada, July 1955 through June 1960.

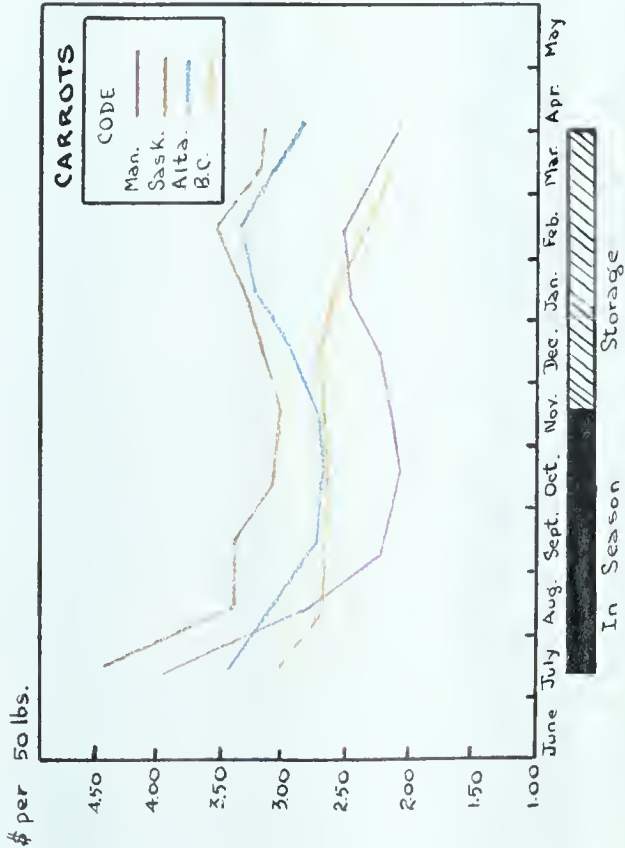


Figure 9.- Prices of Domestic Grown Carrots at Wholesales in Western Canada, July 1955 through June 1960.

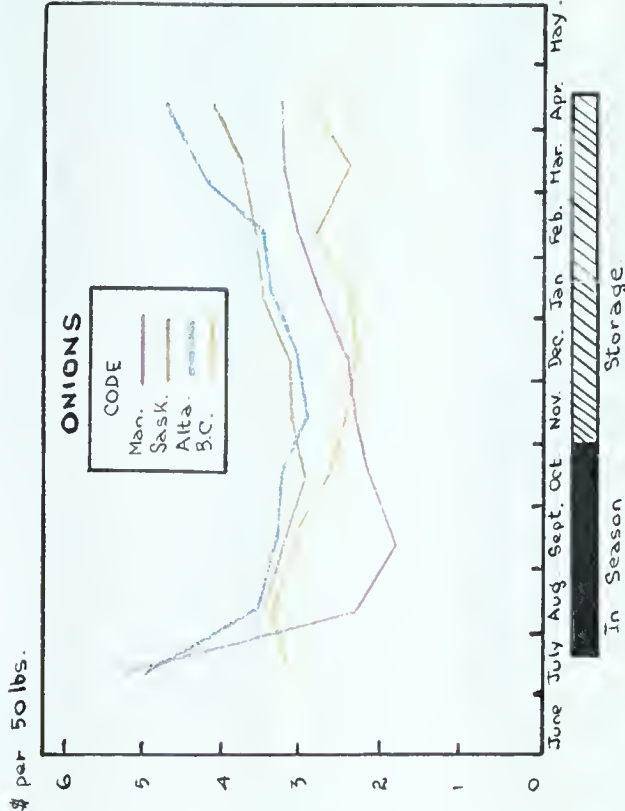
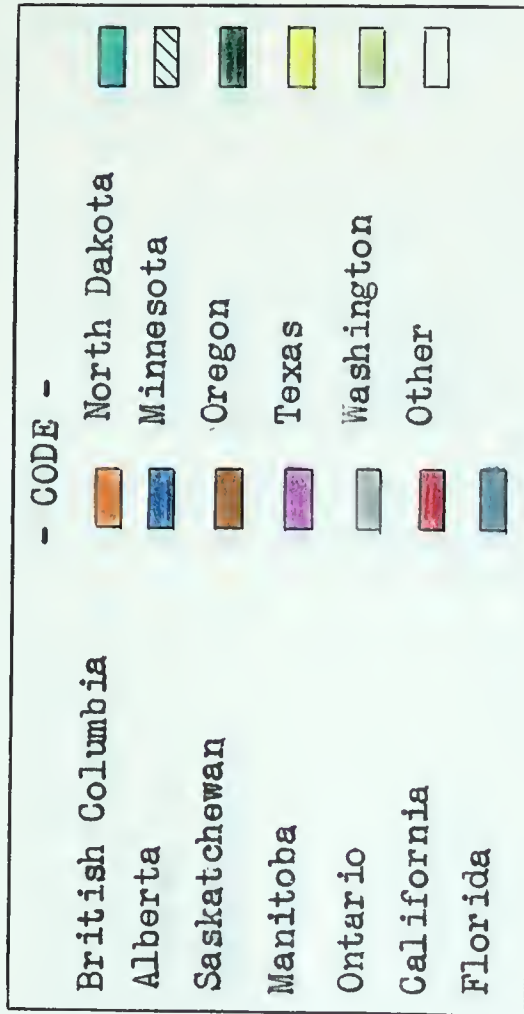


Figure 10.- Prices of Domestic Grown Onions at Wholesales in Western Canada, July 1955 through June 1960.

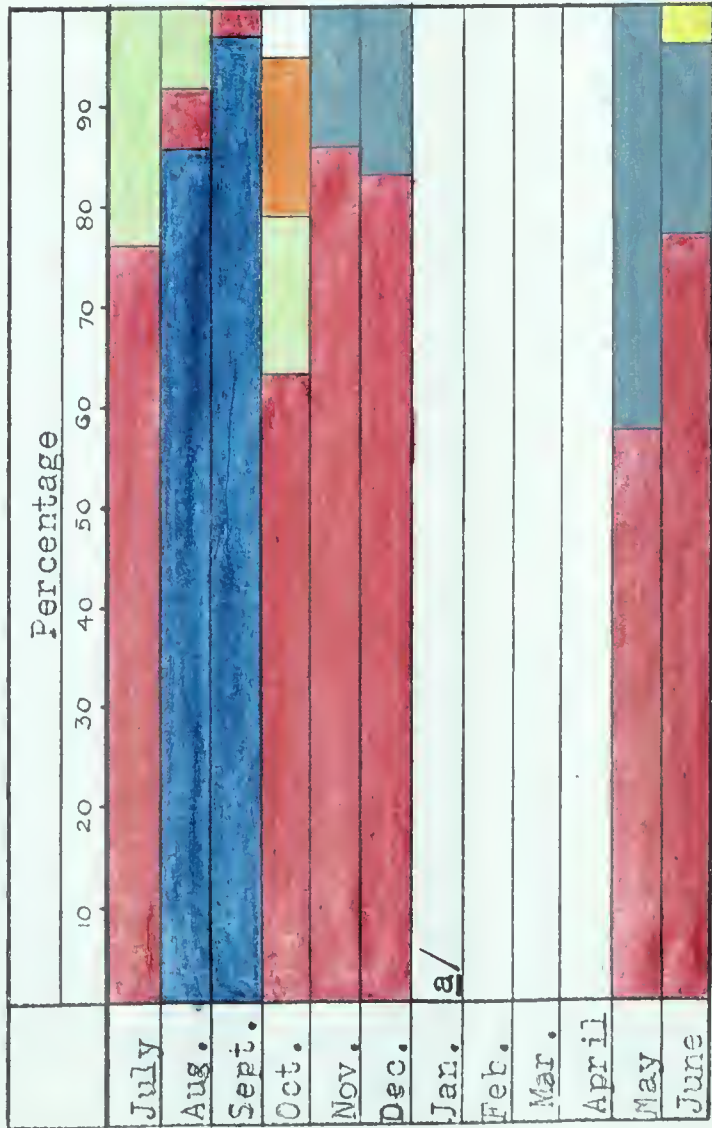




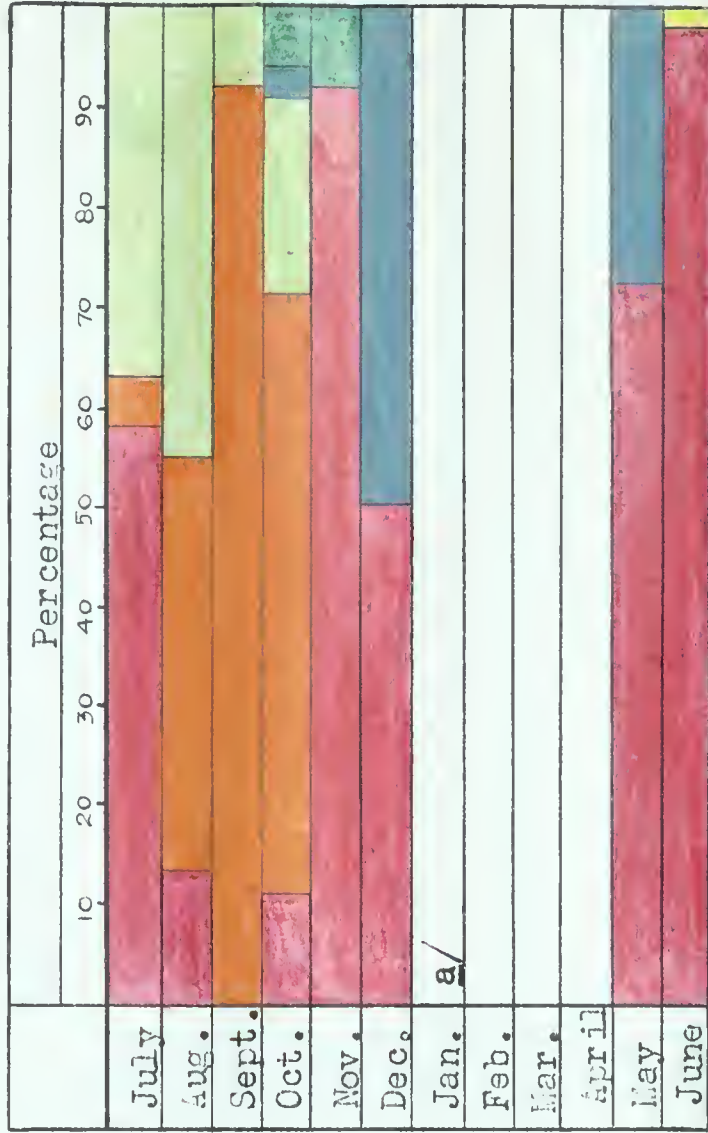
Chart 3.- The percentage of Corn from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.



ALBERTA



BRITISH COLUMBIA



a/ Less than two per cent of the annual supply of Corn entered the market during the months Jan. to April.

10. The following table shows the number of students who took part in the school sports competition in the year 2000.

Sport	Boys	Girls
Football	120	80
Netball	60	100
Table Tennis	40	60
Badminton	30	50
Swimming	20	30
Handball	10	20
Other	10	10

Find

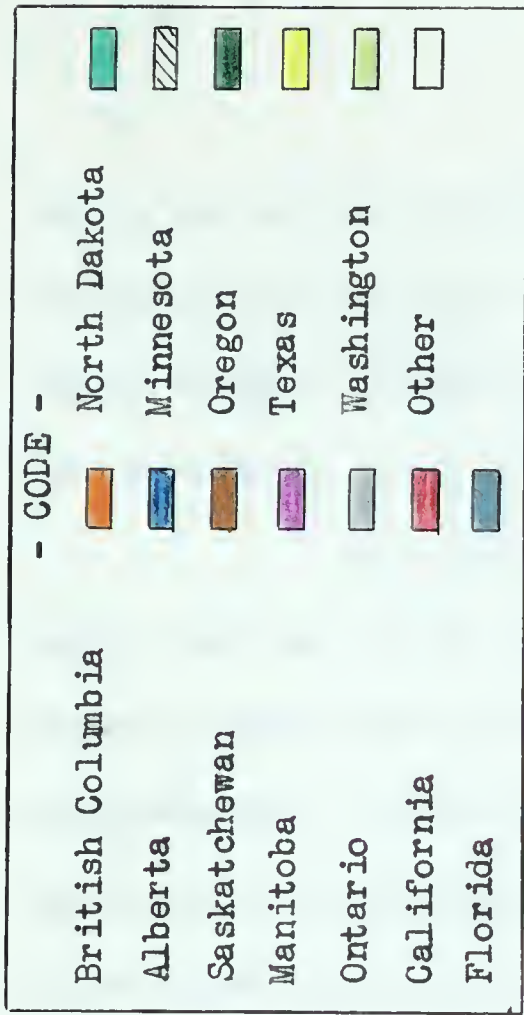
Sport	Boys	Girls
Football	120	80
Netball	60	100
Table Tennis	40	60
Badminton	30	50
Swimming	20	30
Handball	10	20
Other	10	10

the number of students who took part in the school sports competition in the year 2000.

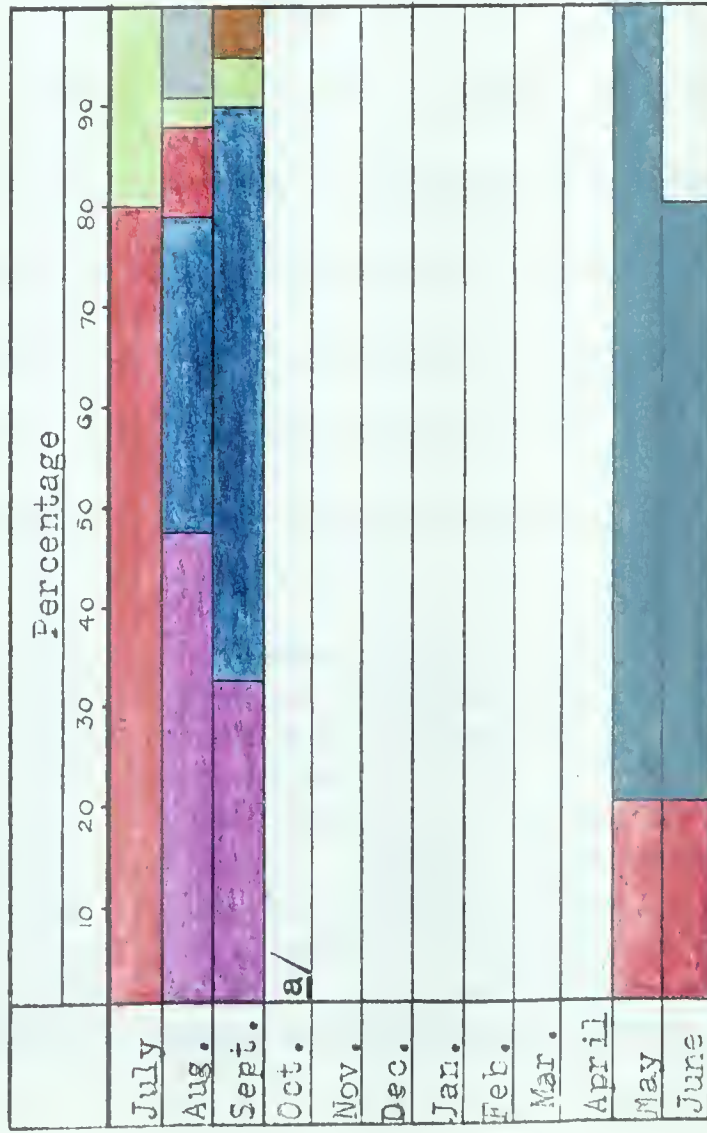
Sport	Boys	Girls
Football	120	80
Netball	60	100
Table Tennis	40	60
Badminton	30	50
Swimming	20	30
Handball	10	20
Other	10	10

11. The following table shows the number of students who took part in the school sports competition in the year 2000.

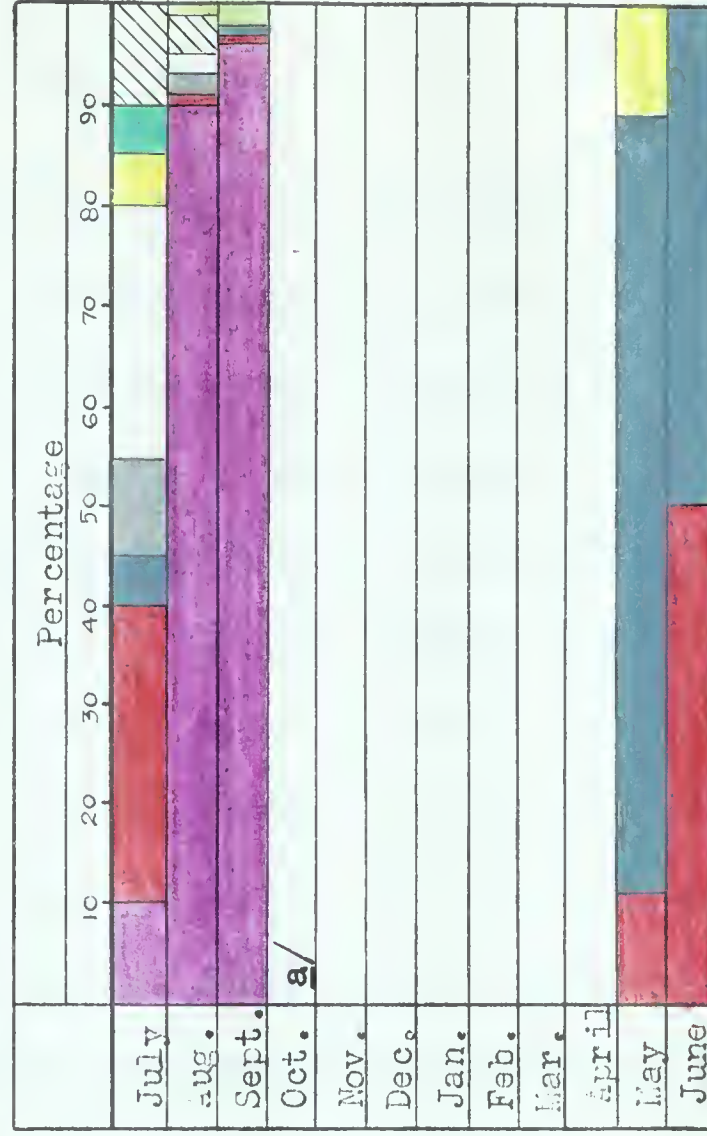
Chart 3A.- The percentage of Corn from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.



#### SASKATCHEWAN



#### MANITOBA



a/ Less than two per cent of the annual supply of Corn entered the market during the months Oct. to April.





add to the cost of transporting fresh corn. It is therefore natural that during the "in season" corn should be supplied almost exclusively from local sources. At other times of the year the comparative advantage lies with those areas which have longer production seasons.

Unfortunately, the wholesale prices of corn are unavailable. One can surmise, however, that the perishability of corn must create a great deal of fluctuation of prices in the local market.<sup>10</sup> Accordingly to enable producers to hedge against the uncertainties of the market, the production of corn will occur under one of two patterns: First, corn for the fresh trade may be produced as a secondary enterprise. Since capital requirements are low, and the production of corn may be integrated with the rest of the farm unit, farmers may grow a considerable amount of corn that eventually enters the commercial market. The quantities of corn that come forth from this pattern of production is likely to be very erratic from year to year. And since the corn produced in this manner represents a return to a secondary enterprise (a speculative enterprise is a better term) the volume of corn that enters the market from this source cannot be closely associated with the costs of production. The second way in which corn may be produced for the fresh market is by the producer who has specialized

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<sup>10</sup>When a commodity is extremely perishable, such as corn, the market supply curve is perfectly inelastic, because once the commodity is in its prime the producer has little alternative except to sell the commodity at the highest price that he is able to extract. This is true even though the market price is below the costs of production. In the latter case the producer will attempt to minimize his losses. By the same token, since the commodity is highly perishable buyers will only purchase that quantity which they can dispose of before spoilage occurs. The market demand curve can thus be depicted as highly inelastic. The effect of fluctuations in supply upon price, given inelastic supply and demand curves, is shown



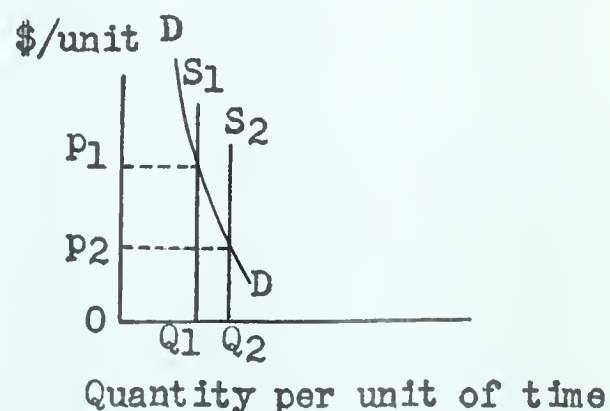


in the production of corn not for the fresh market but for the processing market. In other words, this type of producer, knowing that the market price of corn for the fresh trade is generally higher than for the processing market, will formulate his production plans so to allow for the quantity of corn that he believes he can sell on the fresh market. The other situation that may occur under this pattern of production is that the producer grows corn for the fresh trade on contract with either a broker or a wholesale firm.

From this it follows, that when the size of the market for a fresh commodity is relatively small, and there are a great number of "speculative producers" the only way in which a producer can specialize is by eliminating some uncertainties in the market through some form of a contract, either in the processing trade or the fresh trade.

In Charts 3 and 3A it may be observed that "in season" Alberta supplies almost 90 per cent of the corn entering the commercial markets within the province and approximately 40 per cent of the commercial market in Saskatchewan. Also, there is the possibility that if more firms precool the fresh corn before it is shipped Alberta may

in the insert. Thus, a relatively small increase in the quantity offered for sale, exemplified by a shift in supply from  $S_1$  to  $S_2$ , has a relatively large effect upon the price, from  $p_1$  to  $p_2$ .





increase its share of the Western Canadian market.<sup>11</sup> However, a sizeable increase in Alberta's share of the Western markets should not be anticipated. From Chart 3A, it appears improbable that Alberta could invade the Manitoba market to any major extent, since local supplies in that province already account for over 90 per cent of the market. In the Saskatchewan market Alberta's main competition is from Manitoba, which can probably deliver corn into Saskatchewan at a cost comparable with Alberta, the important factor in this case is in the quality of the corn. In Alberta, local growers already control 90 per cent of the market "in season". And in British Columbia, it would appear from Chart 3, that the easiest competitor to replace is California, which accounts for only 12 per cent of the quantity sold during the month of August. Therefore the prospects of Alberta increasing its share of the Western Canadian market for fresh corn to any large extent are not great.

In the case of cabbages it is quite apparent from Chart 4, that in Alberta the comparative advantage shifts three times during the course of one year. "In season" the comparative advantage lies with the local producers. During the months of August, September, and October, local producers supply over 90 per cent of

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<sup>11</sup>The production of corn apparently has not reached the stage of specialization where individual producers find it profitable to instal their own hydro-cooling units. It is reported that one producer uses cold water in a potato washing machine to precool his corn before shipping. So far, only one wholesale firm in Southern Alberta has installed a hydro-cooling unit. Fruit and vegetable inspectors state that the quality of the corn that is shipped from this plant is superior to the corn that has not been properly cooled. A few of the large canning companies in the irrigation districts have considered the installation of hydro-cooling plants. To date these companies have maintained

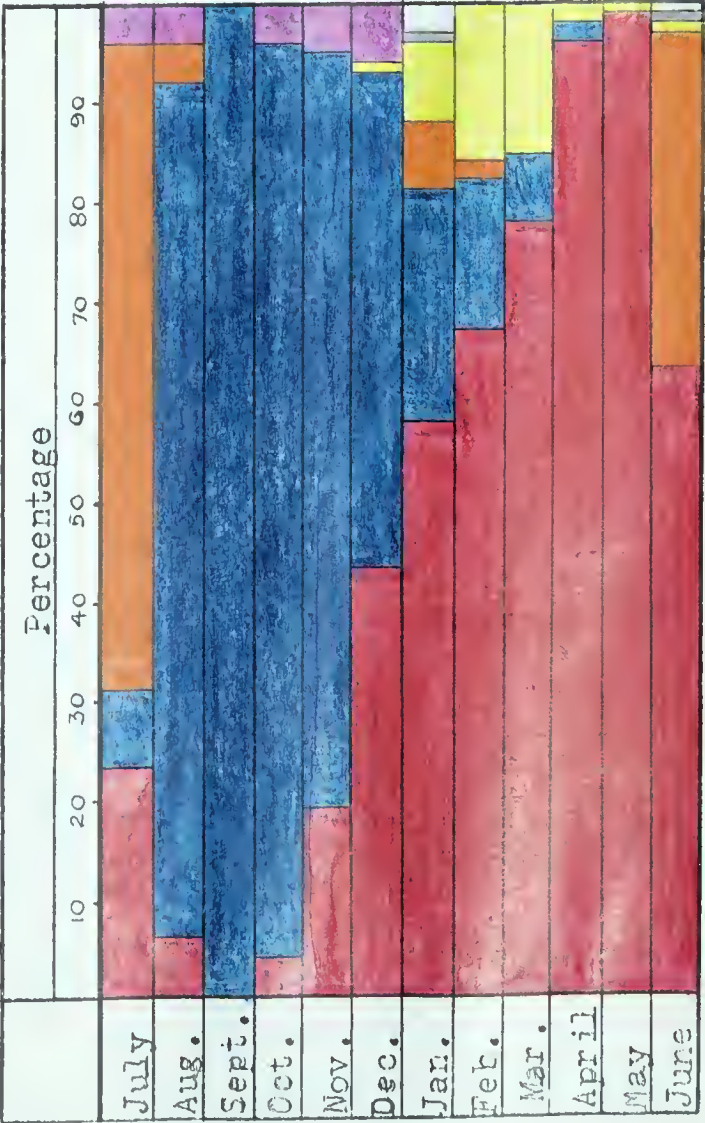




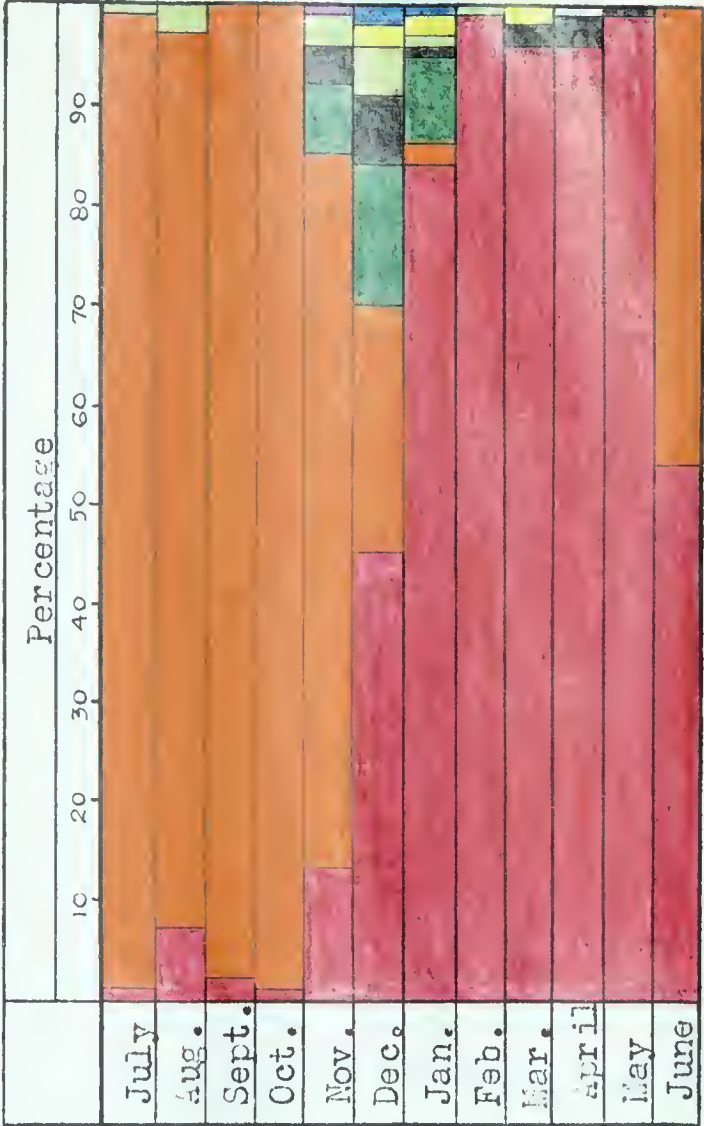
Chart 4.- The percentage of Cabbage from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.



ALBERTA



BRITISH COLUMBIA











provincial markets. Once local supplies go into storage the comparative advantage of local growers decreases as a result of increasing storage costs over time and deterioration of their product. As a consequence, the comparative advantage shifts to California during the months January through June. It may be presumed, that during this period the superior quality of the California product more than offsets any difference in the costs of supply that may favour Alberta. During the month of July the comparative advantage shifts to British Columbia. This shift may be the result of one or two factors. First, during the month of July, new cabbages come "into season" in British Columbia. The closer proximity of British Columbia to the market area of Alberta gives British Columbia a decisive advantage over California in respect to costs of transportation as well as an advantage because of import duties imposed upon California produce. The second factor that comes into play is that during the months of July through November cabbages are "out of season" in California.<sup>12</sup>

In regard to Alberta's share of the cabbage market in Western Canada, it seems reasonable to expect Alberta to maintain its present share. As shown in Charts 4 and 4A cabbage is a

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that the market for fresh corn is not large enough to warrant the cost of such a plant. The installation of hydro-cooling plants however, would certainly increase the comparative advantage of Alberta as an area of supply of fresh corn.

<sup>12</sup>In California the winter cabbage season extends from September through June. See, The Demand and Price Structure for Selected Vegetables, Technical Bulletin No. 1105, United States Department of Agriculture.







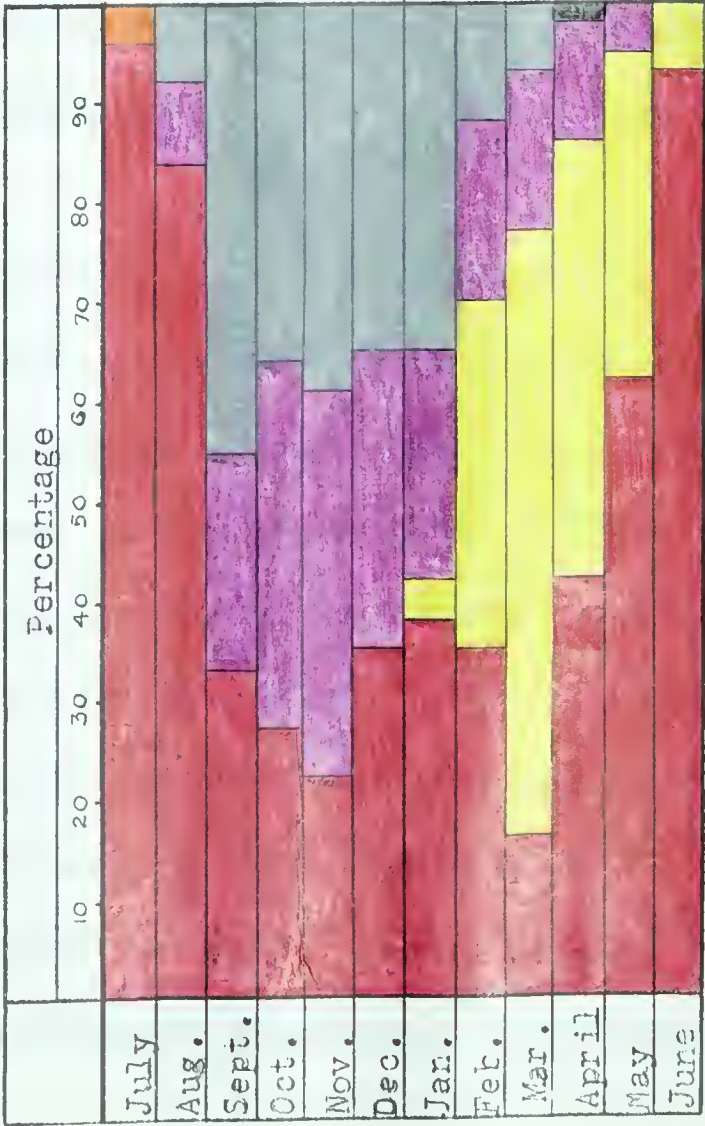




Chart 5A.- The percentage of Carrots from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.



SASKATCHEWAN



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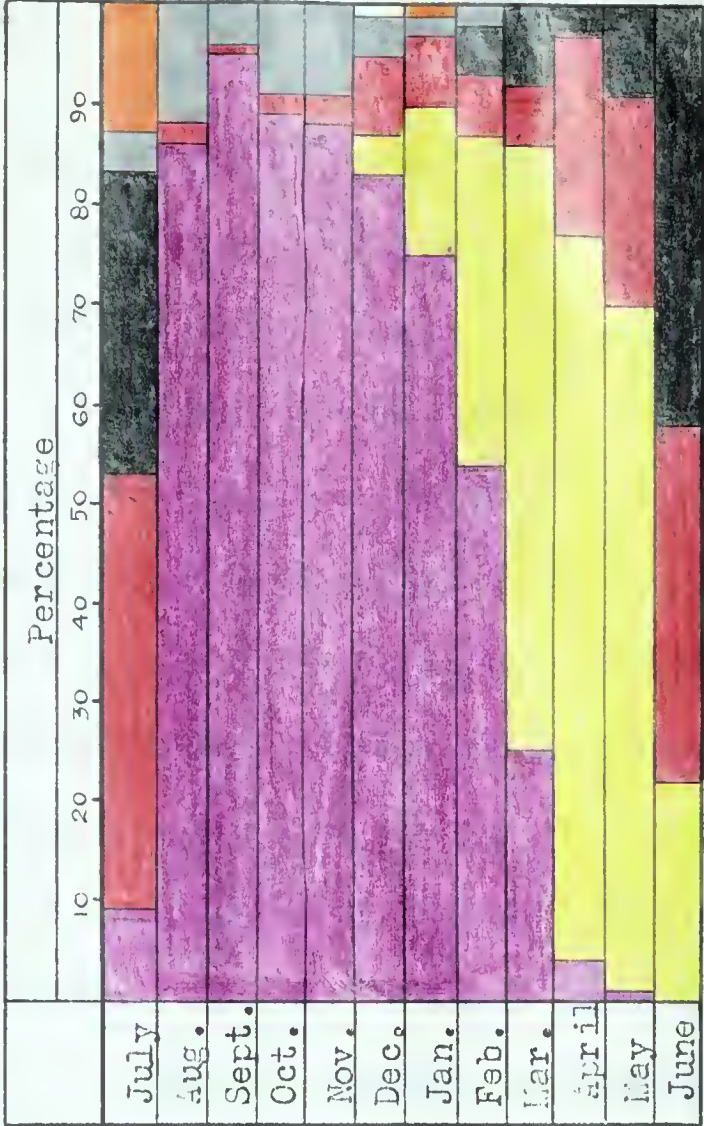




Figure 1



Figure 2

Interval	Left	Mid	Right
[0, 0.25]	0.00	0.12	0.25
[0.25, 0.5]	0.12	0.25	0.37
[0.5, 0.75]	0.37	0.50	0.62
[0.75, 1.0]	0.62	0.75	0.87
Total	1.11	1.25	1.39

The function  $f(x) = x^2$  is continuous on the interval  $[0, 1]$ . The function is increasing on this interval, so the minimum value is at  $x = 0$  and the maximum value is at  $x = 1$ . The function is concave up on this interval, so the minimum value is at  $x = 0$  and the maximum value is at  $x = 1$ .



commodity that in season is supplied to a major extent by local growers. Accordingly, Alberta's principal markets are within the province. The only other province that Alberta supplies with cabbages to any extent is Saskatchewan. From Chart 4A it is apparent that Manitoba has an advantage over Alberta in supplying cabbage to Saskatchewan. A clue to Manitoba's advantage may be obtained by reference to Figure 8, page 60, where it is shown that the wholesale prices in Manitoba "in season" are approximately \$1.00 per hundredweight below the wholesale prices in both Alberta and Saskatchewan. Since the costs of transportation into Saskatchewan are approximately the same from either Manitoba or Alberta, the fact that the price of cabbage is lowest in Manitoba suggests that in the near future Manitoba will continue to maintain a comparative advantage in supplying Saskatchewan. The low prices of cabbage and other commodities in the Manitoba market are discussed in the next chapter. As far as Alberta's share of the cabbage market in Western Canada is concerned it seems unlikely that any substantial change will occur within the near future.

In the case of carrots, it is shown in Charts 5 and 5A that "in season" the markets in British Columbia and Manitoba are dominated by supplies from local growers. On the other hand local growers in Alberta supply less than 50 per cent of the market. What factors restrict local supplies of carrots "in season" to the Alberta markets? The answers put forth by people in the wholesale trade are that Alberta grown carrots, in general, are of an inferior quality as compared to carrots shipped in from California and British Columbia. The bulk of Alberta carrots, the wholesale people say, are grown by non-specialized producers. The carrots





that are produced locally are usually malshaped, and have inferior storage qualities. The reasons given are that local growers do not as a rule grade their carrots before offering them for sale, and in many cases the wrong variety of carrot is grown.

If these difficulties could be overcome Alberta could at least increase its local marketings of carrots during the "inseason". The question of packing carrots in polyethylene bags and the consumer preference for fancy packs cannot be raised as a factor against local supplies, since if the quality and quantity of local supplies are forthcoming the wholesale firms will do their own packaging.

The remaining commodity that is included in Group II is dry onions. While onions have better storage qualities than the other vegetables included in the group, they are, perhaps, more difficult to grow in particular areas than the other vegetables that so far have been considered.

Upon looking at Charts 6 and 6A, onions appear to be rather a "cosmopolitan" type of vegetable, in as much that areas of supply are in many different countries. This may be explained in part by the apparent consumer preference for many different types of onions of different degrees of mildness. However, the bulk of the onions originate from areas of supply that are relatively close to the market. For instance, in season, local supplies dominate the market in Manitoba. The surprising thing is to discover that British Columbia has the apparent comparative advantage in supplying Alberta, while Oregon and Washington supply British Columbia.

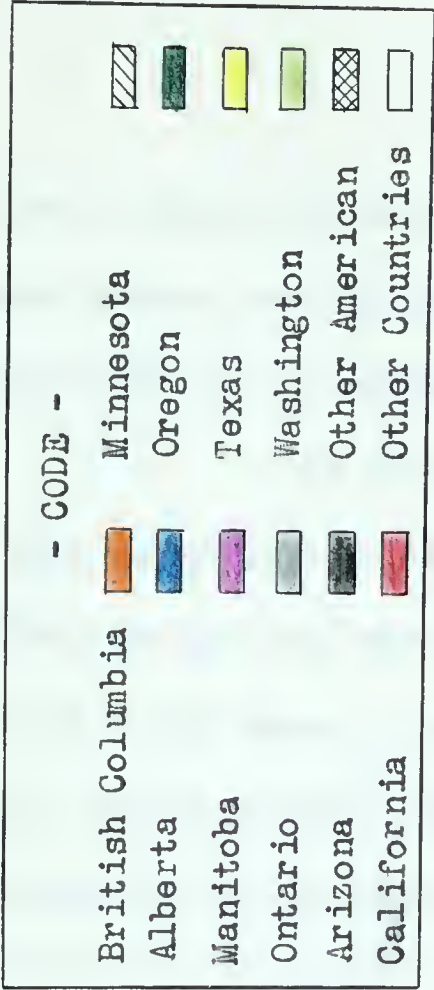








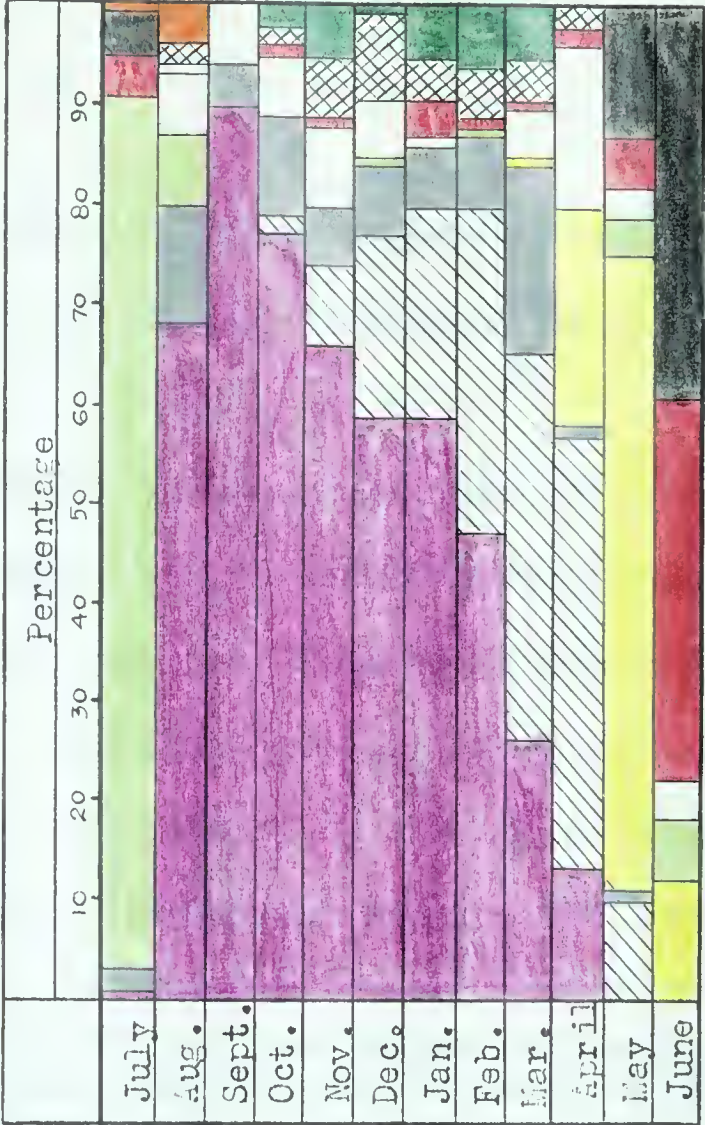
Chart 6A.- The percentage of Onions from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.



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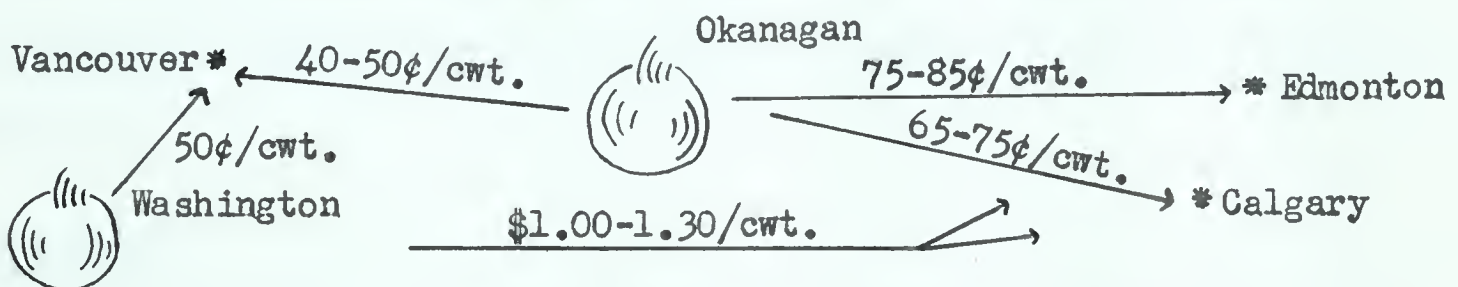


This may be explained in part by the fact that the higher prices of onions in Alberta divert produce grown in the Okanagan Valley to Alberta rather than to the Vancouver market.<sup>13</sup>

One of the problems encountered in the production of onions on a commercial scale in Alberta is the length of the growing season. When onions are sown directly into the field they require approximately 110 to 120 days to mature. The frost-free period in Southern Alberta is approximately 120 days. The relatively short growing season makes onion production a hazardous enterprise in Alberta.<sup>14</sup> However,

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<sup>13</sup>The Okanagan Valley is located approximately 275 miles east of Vancouver and approximately 500 and 700 miles to the west of Calgary and Edmonton, respectively. The movement of onions into British Columbia and into Alberta is shown diagrammatically below.



The transportation cost per hundredweight are approximations. Thus when the onion prices in Calgary and Edmonton are 25 and 35 cents above the prices in Vancouver, one can expect the Okanagan to divert its shipments to the Alberta market. At the same time Washington will continue to ship to the Vancouver market.

<sup>14</sup>During 1958-1959 an onion company was formed by a group of producers in the irrigation districts of Southern Alberta. The company is known as the Bow Island Onion Company. During the crop year 1959-1960 the Company planted approximately 400 acres of hybrid onions (The largest portion sown directly into the field). Due to inclement weather and an early frost in the fall, nearly the entire crop of onions was lost.



the length of the growing season does not rule out the possibility of using transplants in the production of onions on a commercial scale. Such a procedure, however, adds to the cost of production and the question arises whether or not onions could not be transported into Alberta at a lower cost from areas of supply that have longer growing seasons. Certainly this is a case in which lower costs of transportation benefits those areas with the longer growing seasons.

On the other hand, it seems reasonable to believe that Alberta's share of the onion market in Western Canada depends on the development of earlier maturing varieties of onions. If these could be developed, presumably the costs of producing onions would be low enough to give the local producer the advantage, and the local growers' share of the Alberta market would be similar to the present situation in Manitoba.

### GROUP III

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The two vegetables included in this group are tomatoes and celery. In general, these vegetables have poor storage characteristics; they are not well adapted to the climatic conditions of Western Canada, they require a considerable amount of labour in their production, and in the marketing of these vegetables the quality of the product is an extremely important factor. It may be noted that in the grouping of these vegetables we have progressed from vegetables with relatively good storage characteristics which can be grown under field conditions in an extensive manner towards vegetables that have relatively poor storage characteristics and which require intensive cultivation and attention. In the case





of Group III another factor must be taken into account, and that is the quality of the product. This statement is not intended to imply that quality is not important in the other vegetables so far considered, but in the case of tomatoes and celery quality is especially important since these vegetables are usually consumed while they are in the fresh state.

Both tomatoes and celery require a lengthy growing period, and both vegetables when grown on a commercial scale are usually started in greenhouses or hotbeds. For example, tomatoes require from 30 to 40 days in greenhouses and cold frames and another 70 to 80 days in the field before the plants bear fruit.<sup>15</sup> Celery requires yet a longer growing season with approximately 40 to 60 days in the seed beds and another 120 days in the field.<sup>16</sup>

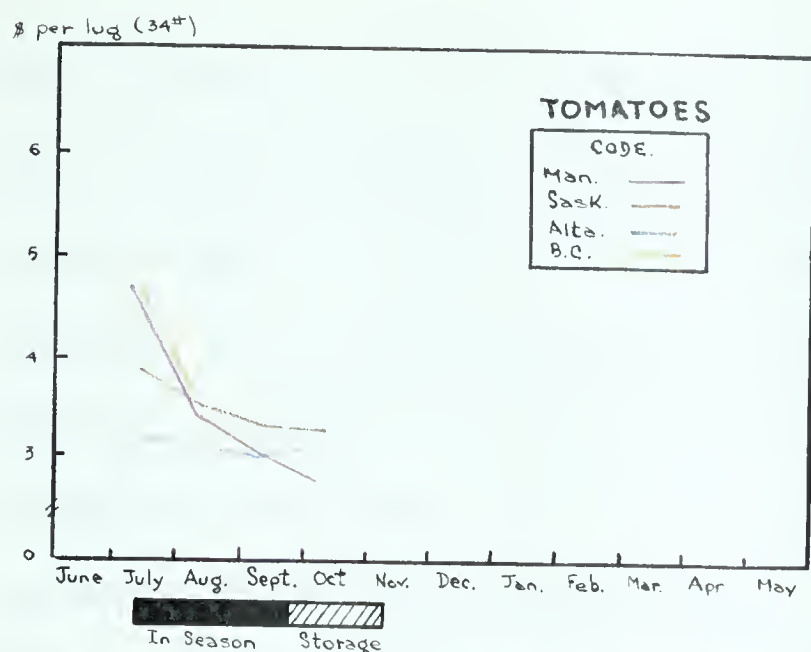
In Alberta, the harvest period and the storage period is relatively short for both of these vegetables. In the case of tomatoes the early plants may bear fruit during the latter part of July. However, the season abruptly ends with the first killing frost which usually occurs mid-September. While it is true that tomatoes grown in the family garden are often stored and ripened in the family dwelling for periods up to 3 months, on a commercial basis it would appear impractical to store tomatoes for more than one month because of spoilage and

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<sup>15</sup>Commercial Production of Tomatoes Farmers' Bulletin No. 2045 United States Department of Agriculture, Washington.

<sup>16</sup>Celery Growing Farmers' Bulletin No. 1269, United States Department of Agriculture, Washington.





**Figure 11.- Prices of Domestic Grown Tomatoes at Wholesales in Western Canada, July 1955 through June 1960.**

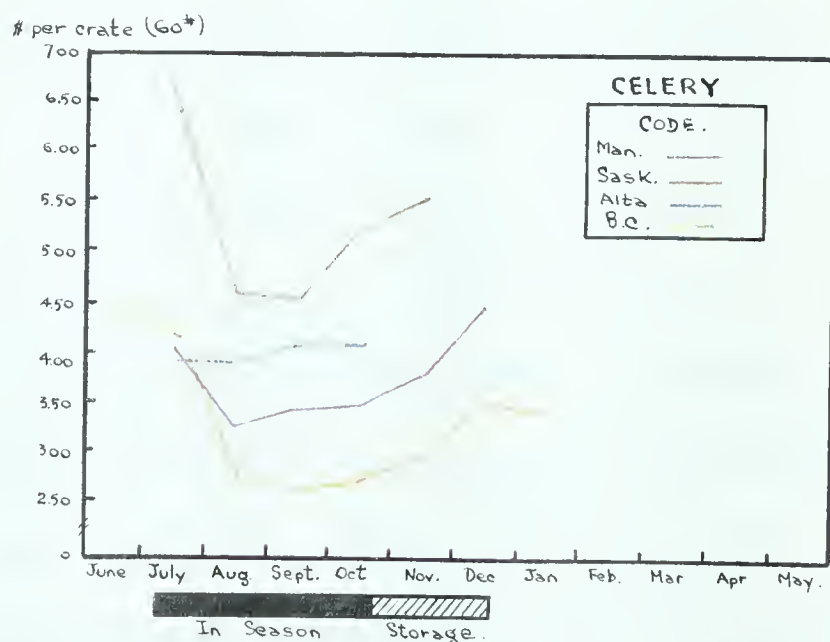
Celery can withstand a limited amount of frost in the fall, because it is protected by the soil. However, it is very sensitive to cold weather in the spring, since a "chill" while the plants are small may cause them to bolt later and to set seed rather than form stalks. Celery may be stored for a period of two to three months, providing temperature and humidity conditions are

correct. One wholesale purchasing agent stated that the cost of storing celery was only a few cents per pound below the cost of transporting fresh celery into Alberta from California, and that the superior quality of the fresh celery

gave it a decisive advantage in the retail market.<sup>17</sup> The same person

deterioration in quality; not to mention the added cost of storage in the way of space, temperature control, and labor.

Celery, when grown in Alberta, generally is not harvested until September and October.



**Figure 12.- Prices of Domestic Grown Celery at Wholesales in Western Canada, July 1955 through June 1960.**

<sup>17</sup>From discussions and interviews held with men in the wholesale trade.



also commented on the "toughness" of local grown celery and celery that is grown in British Columbia. He made the claim that celery grown locally and in British Columbia was usually "tough" and "stringy" as a result the popularity of domestic grown celery was declining in Alberta. The poor quality of celery he attributed to production techniques, and in part to the packaging and handling of the celery after it has been produced.

In regard to quality, it was pointed out by people in the wholesale trade that uniformity of size and a lack of blemishes was desirable in tomatoes. Also, it was pointed out that tomatoes for the fresh trade should be "fleshy" and have thick walls and thick but not tough skins which can withstand considerable handling. On the other hand, tomatoes for the processing trade should be "juicy" with thin skins which are tough and easily peeled. It was also pointed out that tomatoes when grown for processing should ripen with uniformity throughout the field and within a short period of time so they may be harvested in one operation. On the other hand a field of tomatoes grown for the fresh trade should ripen in stages. This points to fundamental differences that exist between the production of tomatoes for the fresh trade and production of tomatoes for canning and processing. Different products are required in each trade. Moreover, the problems encountered in the marketing of tomatoes for the fresh trade are quite different than for processing. The length of the harvesting period and the storage period being a very important factor in marketing fresh tomatoes.





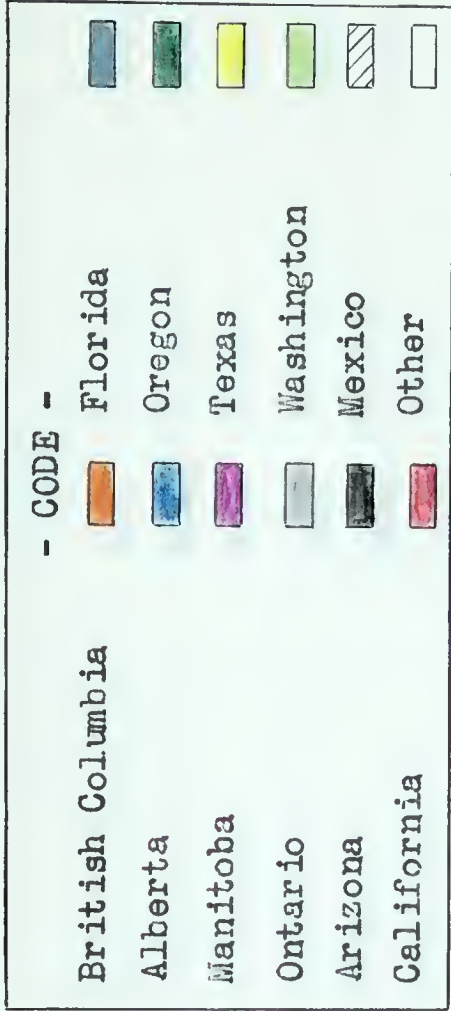
In Charts 7 and 8 it is shown that local growers supply an insignificant proportion of the commercial market for tomatoes and celery in Alberta, even "in season". The reasons that local growers do not have a larger share of the Alberta market, undoubtedly, can be associated with the high costs of producing and storing these vegetables in Alberta, as compared to the costs of production and the costs of transporting these vegetables into Alberta from areas of supply that have longer growing seasons, hence lower costs of production.

This does not rule out the possibility that new varieties of these vegetables adapted to the climatic conditions of Alberta may be introduced. Even then Alberta's share of the Western Canadian market for these vegetables would be restricted. It may be presumed that if varieties of tomatoes and celery are introduced that are adapted to the climatic conditions of Alberta, these same varieties would grow almost equally well in the other provinces of Western Canada. Hence as in the case of cabbages, or corn, production would tend to become local in each province, and the portion of the Western Canadian market that Alberta could obtain would be the Alberta market and perhaps a portion of the Saskatchewan market. This, of course, would be limited to the "in season" period of the year plus the short period during which these vegetables may be stored. During the remaining portion of the year the comparative advantage would still remain with areas of supply outside of Alberta.

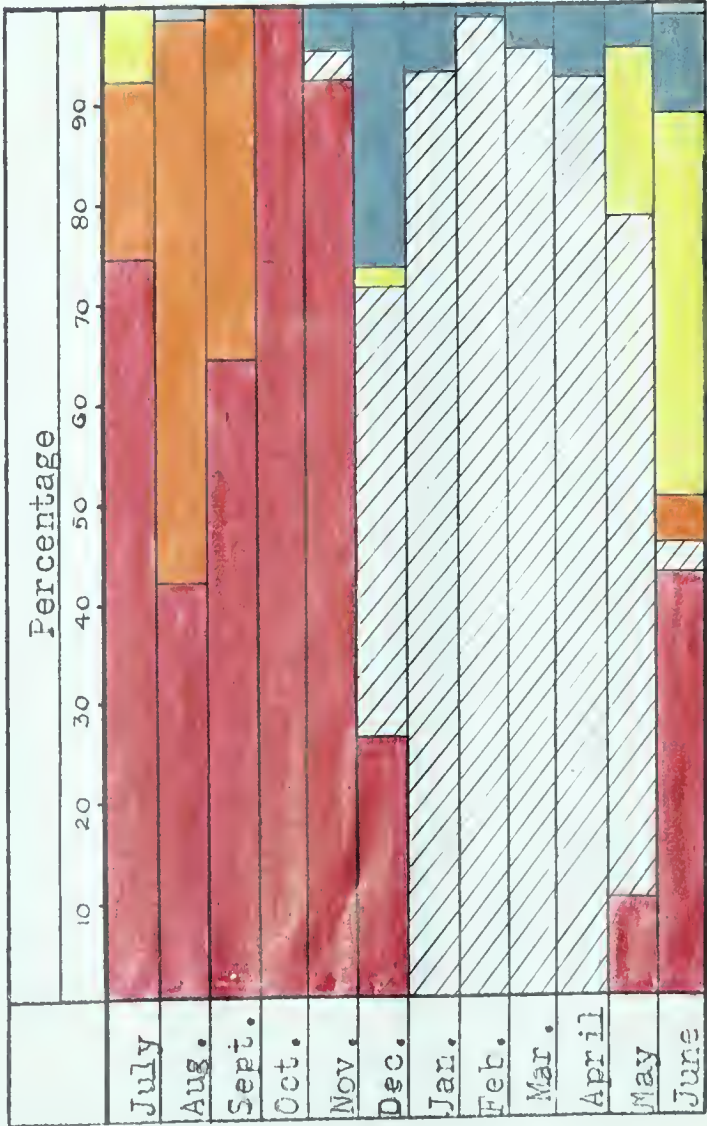
The above, of course, is purely hypothetical, and



Chart 7.- The percentage of Tomatoes from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.



ALBERTA



BRITISH COLUMBIA

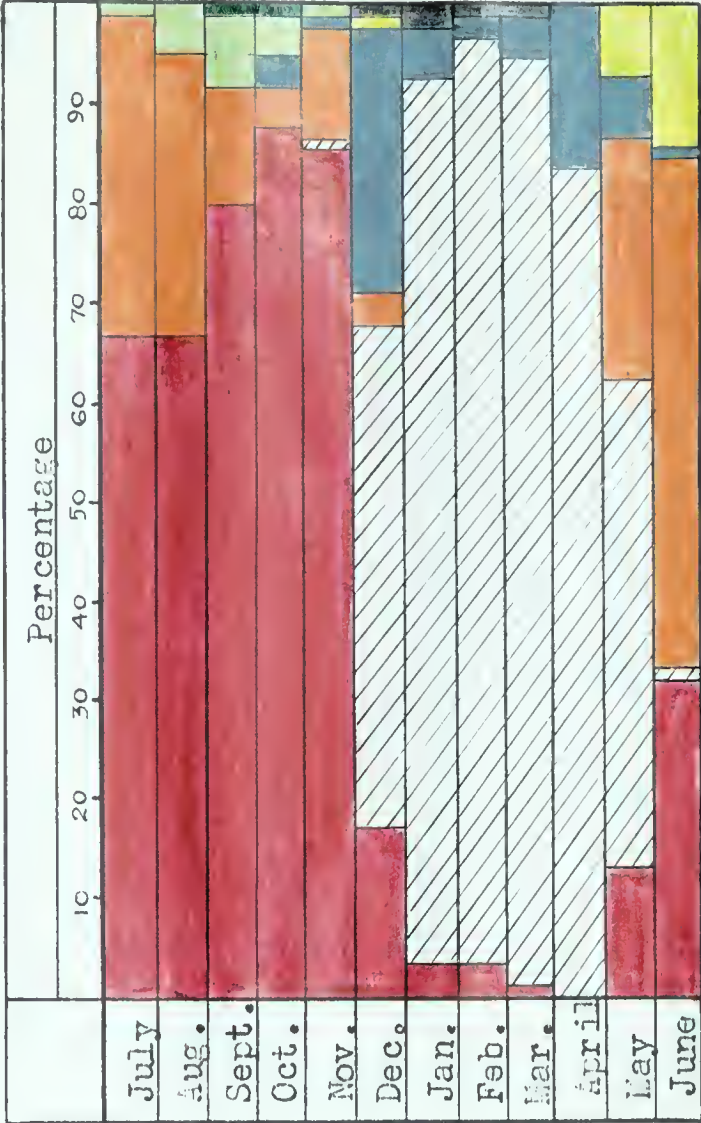
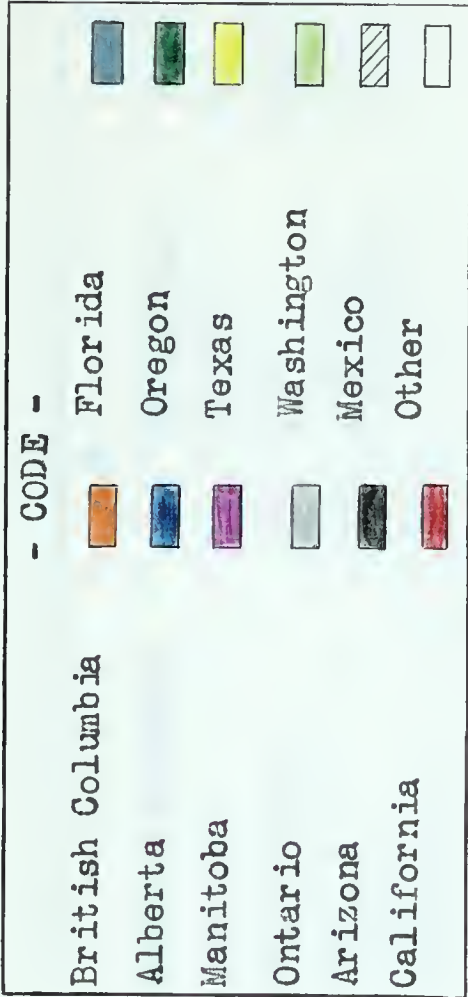


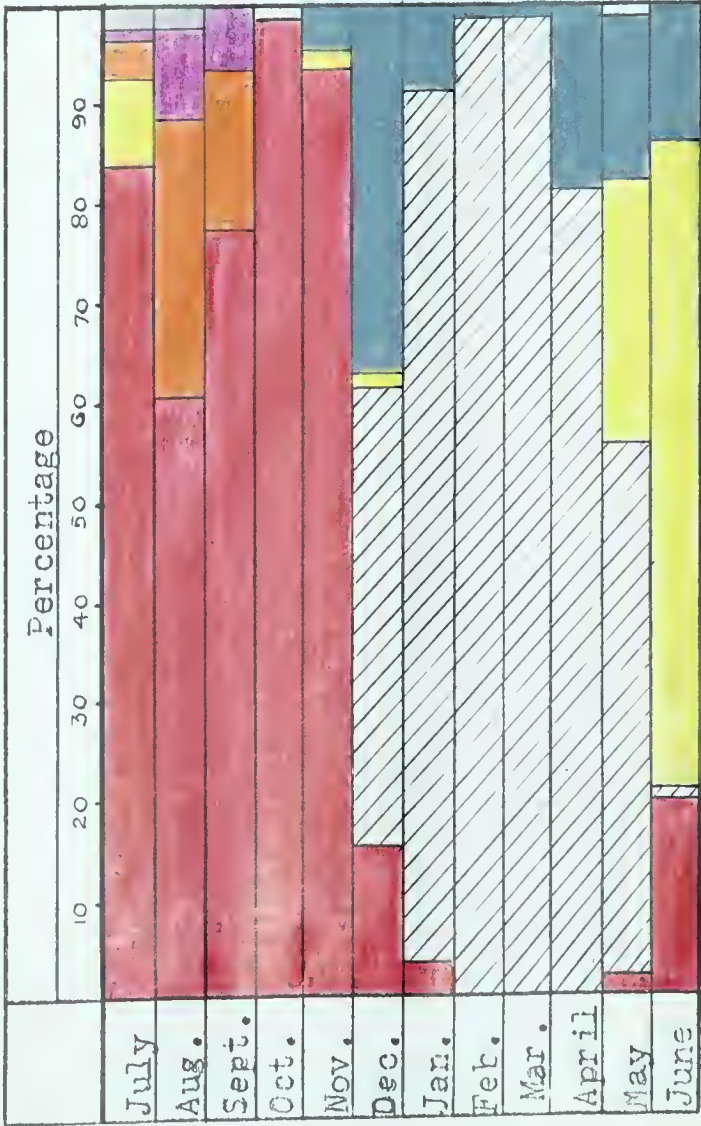




Chart 7A.- The percentage of Tomatoes from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.



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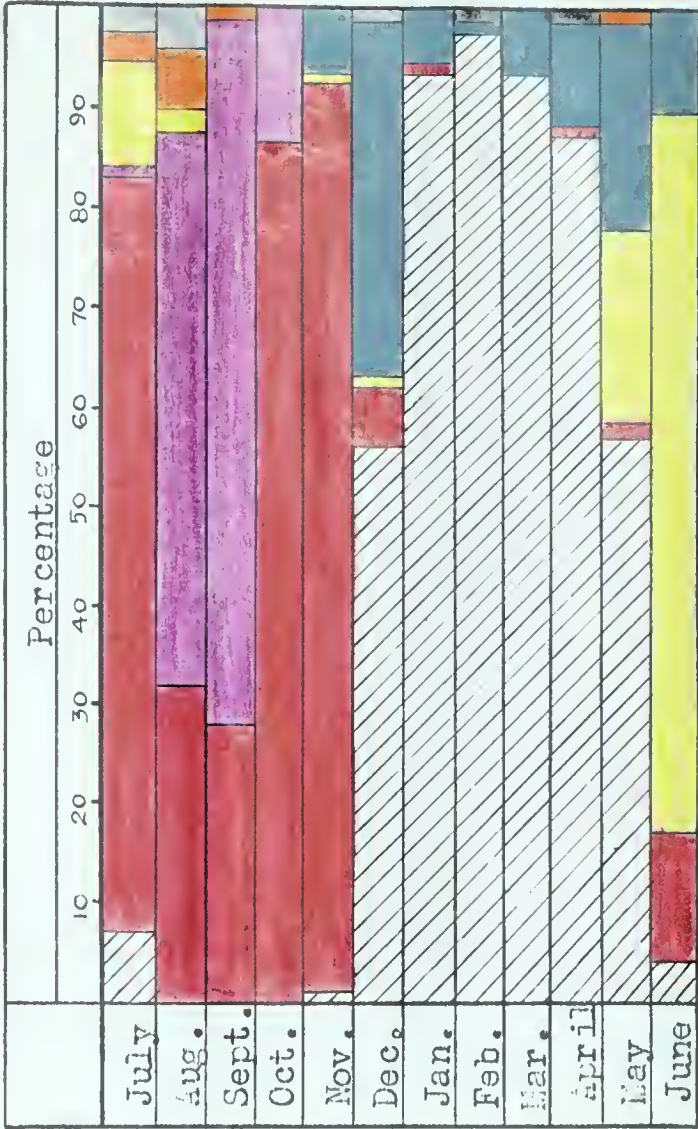
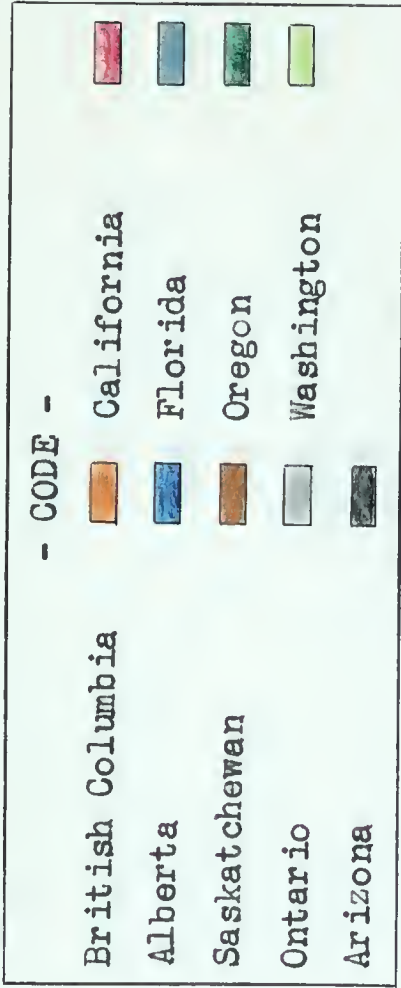
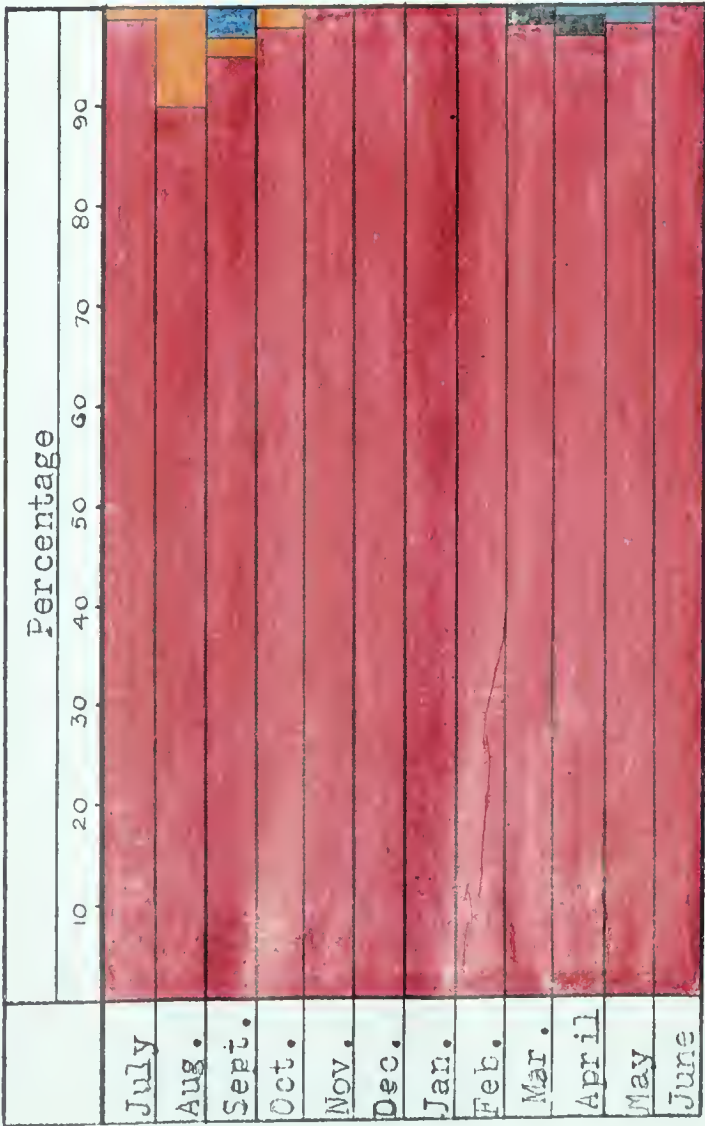




Chart 8.- The percentage of Celery from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.



ALBERTA



BRITISH COLUMBIA

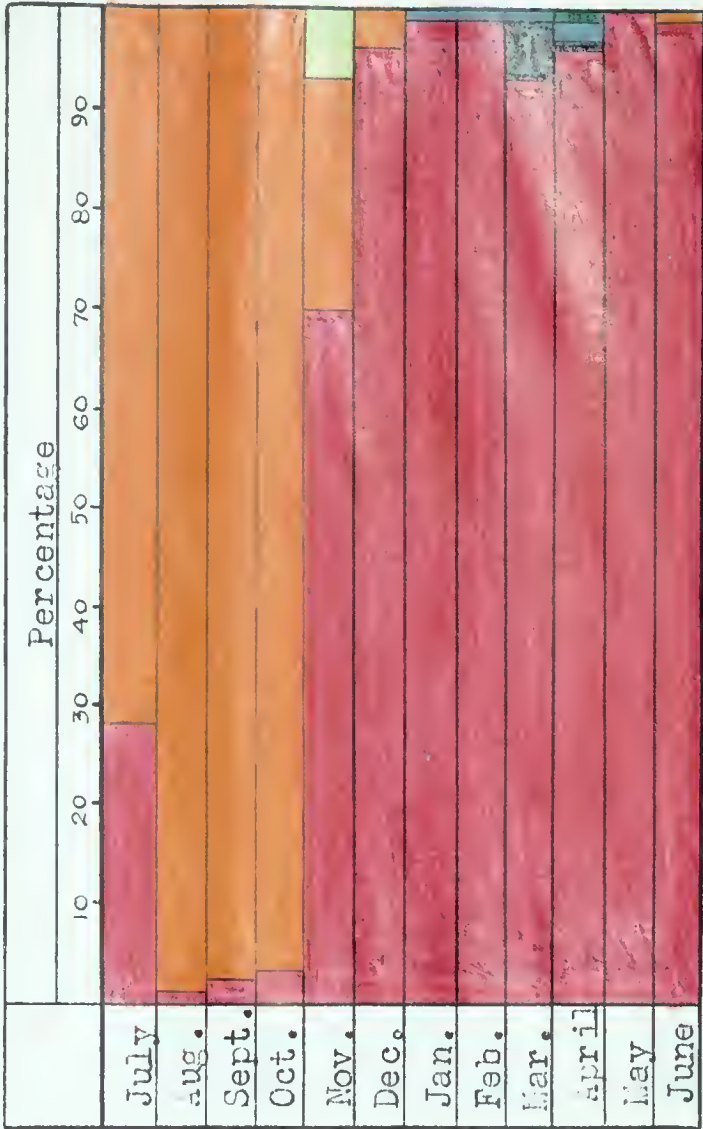






Figure 1: Distance vs. Time

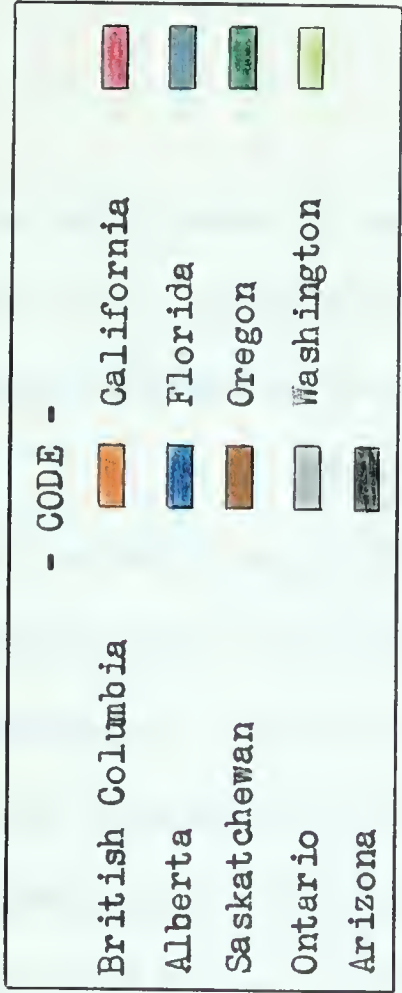


Figure 2: Velocity vs. Time

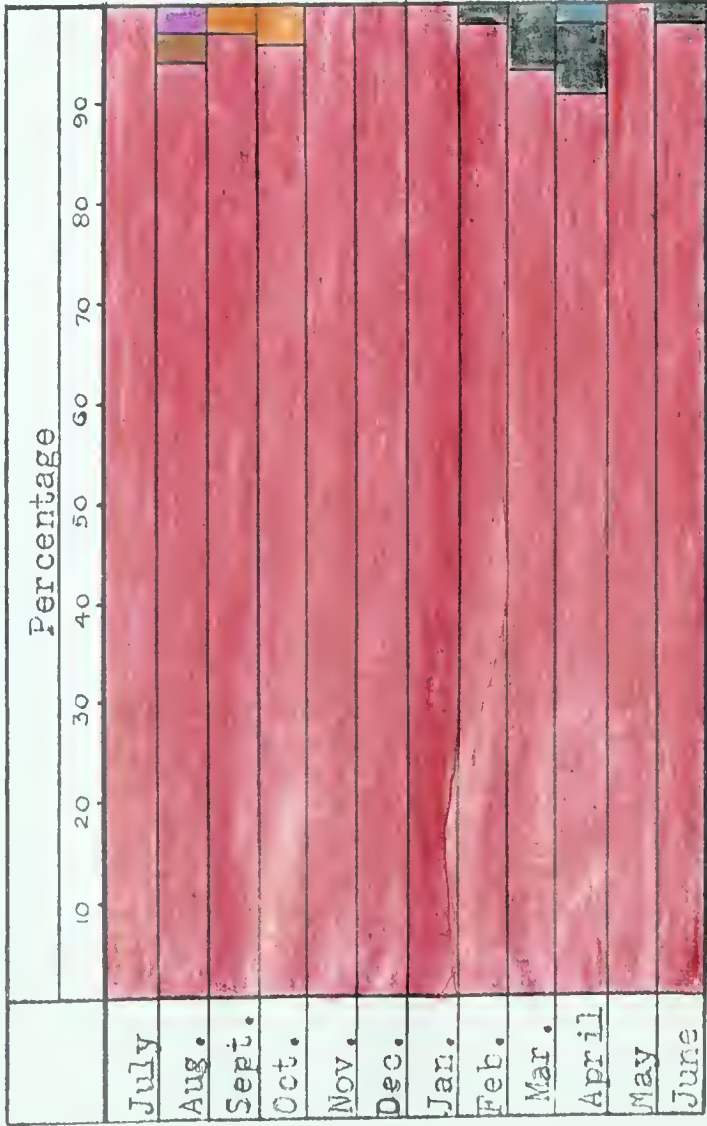
Time (s)	Distance (m)	Velocity (m/s)
0	0	0
10	100	10
20	200	10
30	300	10
40	400	10
50	500	10

Figure 1 shows the relationship between time and distance for a car moving at a constant speed. The data points show a linear increase in distance over time, indicating constant positive acceleration. Figure 2 shows the relationship between time and velocity for the same car. The data points show a constant velocity of 10 m/s, indicating that the car is moving at a steady speed.

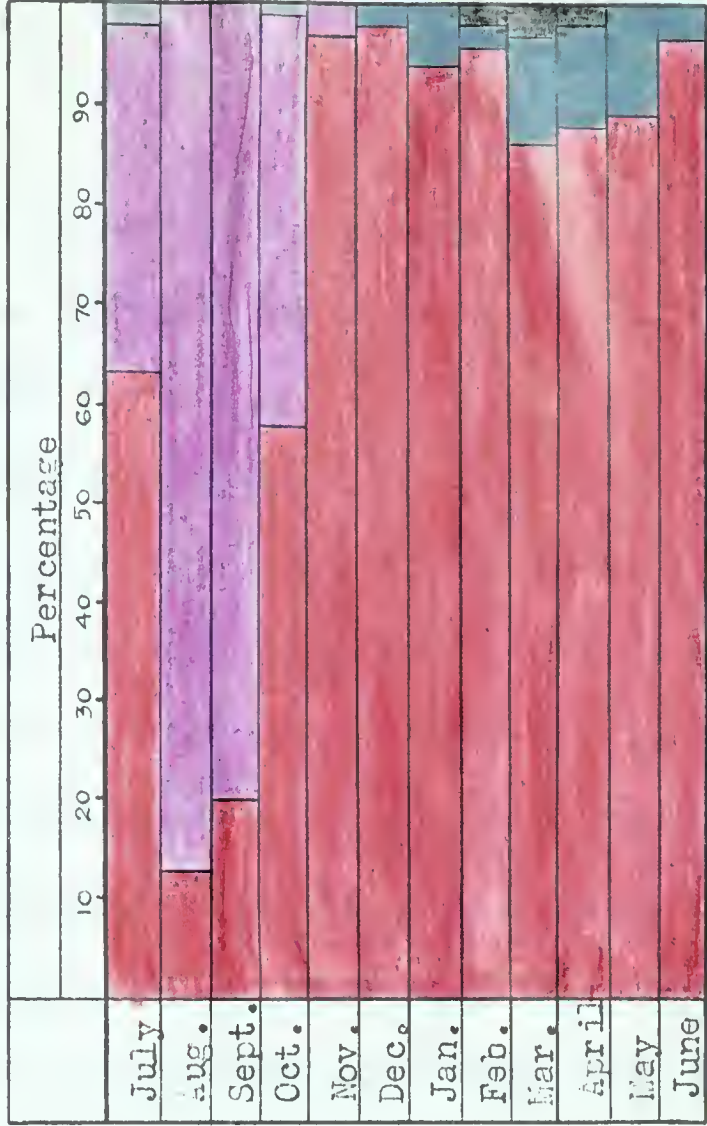
Chart 8A.- The percentage of Celery from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.



SASKATCHEWAN



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in the near future it seems far more realistic to assume that areas other than Alberta will continue to supply tomatoes and celery to Western Canada on a year-round basis.

It would therefore seem that in the near future, given the existing costs of transportation and costs of storage, Alberta's share of the Western Canadian market for six of the eight commodities is likely to remain constant. The two vegetables which may be exceptions are carrots and onions. In the case of these two vegetables the development of earlier maturing varieties and the adoption of higher standards in grading and packaging may increase Alberta's share of the market to the point where at least "in season" the provincial supplies originate with local growers.



## CHAPTER V

### SUMMARY AND CONCLUSIONS

From the last chapter it is apparent that seasonality is an important factor in determining the comparative advantage of different areas of supply in selling vegetables in Western Canada. In general, the growing seasons in the four western provinces occur almost at the same time.<sup>1</sup> Thus, when vegetable crops are "in season" in Alberta they are likewise "in season" in the other three provinces. By the same token, it is apparent that vegetables that are adapted to the climatic conditions in Alberta are likewise adapted to the climatic conditions in the other provinces. Strictly on the basis of seasonality and climate then, it is evident that Alberta has no clear advantage in supplying vegetables to the other provinces. It is also

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<sup>1</sup> Based on the time of the year that produce from the different provinces enters the market it would appear that the growing season in British Columbia is approximately 4 weeks earlier than in Alberta or Manitoba. The growing season in Saskatchewan, it appears, is approximately 2 weeks later than Alberta or Manitoba. British Columbia, of course, has the advantage of a longer growing season as compared to the other three provinces. For marketing dates see Crop and Seasonal Price Summaries.





apparent that local markets are most easily captured by local producers, who have a locational advantage when transportation costs are considerable. Hence for the vegetables included in Groups I and II, it may be stated that generally the commercial market is supplied from local sources within each province during the period in which they are in season and during the period in which their quality from storage is to some extent comparable to the fresh state. From this it follows that for commercial vegetables producers in Alberta, the provincial market is an important outlet.

In Table III Alberta's share of the commercial market in the Province is summarized for the eight vegetables. To obtain a perspective of the market for each vegetable, the quantities are given as well as Alberta's share of the market, which is expressed in percent. The Table is divided into three parts:

- a) the size of the commercial market in Alberta during the period of one year;
- b) the size of the market during the period in which each vegetable crop is "in season" in Alberta; and
- c) the size of the market during the period in which each vegetable is "out of season" in Alberta.

The latter includes Alberta grown supplies that originate from storage. The time of the "in season" period was somewhat arbitrarily assigned because the data used are based on months. Thus, while local grown new potatoes enter the market during the second and third weeks in July the larger volumes come in August. Similarly, while the harvest period



Table III. - Alberta's Share of the Commercial Market in Alberta for Eight Fresh Vegetables During the Period:  
a) One Year, b) "In Season" and c) "Out of Season"; Based on a Five Year Average, July 1955 Through June 1960.

	Group I			Group II			Group III		
	Potatoes:	Turnips:	Corn	Cabbage	Carrots	Onions	Tomatoes:	Celery:	
a)									
Size of the commercial market in Alberta; in 000's lbs.	49,420	2,718	1,757	7,978	6,994	9,377	13,415	7,313	
Alberta's share of the market; in 000's lbs.	37,372	2,276	854	1,862	690	313	22	11	
in percent	<u>75.6</u>	<u>83.7</u>	<u>48.6</u>	<u>23.3</u>	<u>9.9</u>	<u>3.3</u>	<u>0.2</u>	<u>0.2</u>	
b)									
The "in season" period of supply relative to Alberta	Aug-Oct	Aug-Oct	Aug-Sept	Aug-Oct	Aug-Oct	Sept-Oct	Aug-Sept	Aug-Oct	
Size of the market "in season"; in 000's lbs.	10,493	475	941	908	945	1,764	3,232	1,267	1
Alberta's share of the market "in season"; in 000's lbs.	9,785	462	854	822	354	68	-----	11	8
in percent	<u>93.2</u>	<u>97.3</u>	<u>90.8</u>	<u>90.5</u>	<u>37.5</u>	<u>0.4</u>	<u>-----</u>	<u>0.1</u>	1
c)									
Size of the market "out of season"; in 000's lbs.	38,927	2,243	816	7,070	6,049	7,613	10,183	6,046	
Alberta's share of the market "out of season"; in 000's lbs.	27,587	1,814	-----	1,040	336	245	22	-----	
in percent	<u>70.9</u>	<u>80.9</u>	<u>-----</u>	<u>14.7</u>	<u>5.6</u>	<u>3.2</u>	<u>0.2</u>	<u>-----</u>	

Source: Appendices I and II



is generally over during the last week in September and the first week in October, much of the produce does not go into regular storage until the end of October. The "in season" of potatoes was therefore designated as August through October.

The percentages shown in the tables are a summary of the bar charts of Alberta that are illustrated in Charts 1 through 8. As noted in the last chapter, "in season" local supplies account for 90 percent or more of the potatoes, turnips, corn, and cabbage that enter the Alberta market. Obviously, during the "in season" it is impossible for local growers to increase their share of the market by any substantial amount. Out of season the share of the market held by local growers is somewhat less. But, out of season the share of the market held by local growers is not only dependent upon the adaptability of the particular vegetable to the climate in Alberta, but is also dependent upon the storage characteristics of the vegetable. Consequently, in the case of these vegetables, if local growers are to increase the quantity of produce that they sell in the provincial market they will have to rely primarily upon growth in the size of the market. In the case of carrots and onions there is room for the local growers to increase their share of the provincial market as well as relying upon a growth in the size of the market. This is also true of tomatoes and celery. However, the lengthy growing season of these vegetables provides reason to believe that local supplies will not expand to any great extent.





Just as Table III depicts Alberta's share in the provincial market so Table IV depicts Alberta's share of the commercial market in Western Canada. In Chapter IV it was indicated that given the present costs of production, transportation, and storage, no substantial change could be anticipated in Alberta's share of the market in the near future, with the possible exception of carrots and onions.

One of the factors that limits the size of Alberta's share of the market in the other three Western provinces is the fact that when a particular vegetable is in season in Alberta it is also in season in the other provinces. This is also generally true of the time during which the commodity is in storage in Alberta. Hence, in order for Alberta growers to enlarge their share of the market in another province, they must compete to some extent with local supplies in that province as well as competing with other areas of supply that are relatively close to that province. Thus, transportation charges become an important factor. While high costs of transportation are to the advantage of the local grower in the local market, because they give him a locational advantage, at the same time they are to his disadvantage when he attempts to invade an "outside" market with his produce. To overcome this disadvantage the Alberta producer must have his costs of production, or his costs of production and costs of storage (depending upon the season) below that of his competitors in the other province by a difference equal to the



Table IV. - Alberta's Share in the Commercial Market in Western Canada for Eight Fresh Vegetables During the Period: a) One Year, b) "In Season" and c) "Out of Season". Based on a Five Year Average, July 1955 Through June 1960.

	Group I			Group II				Group III		
	Potatoes	Turnips	Corn	Cabbage	Carrots	Onions	Tomatoes	Celery		
a)										
Size of the commercial market in Western Canada; in 000's lbs.	258,414	12,036	7,066	32,997	34,253	42,775	51,819	28,132		
Alberta's share of the market; in 000's lbs.	61,154	4,717	960	2,066	693	388	22	11		
in percent	23.7	39.2	13.6	6.3	2.0	0.9	0.04	0.04		
b)										
The "in season" period of supply relative to Alberta.	Aug-Oct	Aug-Oct	Aug-Sept	Aug-Oct	Aug-Oct	Sept-Oct	Aug-Sept	Aug-Oct		
Size of the market "in season"; in 000's lbs.	64,650	2,665	3,955	4,944	5,687	8,470	11,988	5,301		
Alberta's share of the market "in season"; in 000's lbs.	15,661	823	960	857	355	95	-----	11		
in percent	24.2	30.9	24.3	17.3	6.2	1.1	-----	-----		
c)										
Size of the market "out of season"; in 000's lbs.	193,764	9,371	3,111	28,053	28,566	34,305	39,831	22,831		
Alberta's share of market "out of season"; in 000's lbs.	45,493	3,894	-----	1,209	338	293	22	-----		
in percent	23.5	41.6	-----	4.3	1.2	0.8	0.05	-----		

Source: Appendices I and II





cost of transportation.<sup>2</sup> In this case, the Alberta producer may be said to be substituting costs of transportation for costs of production (and storage). In any case, it should be obvious that the most important markets to any vegetable producer are the markets which are the closest. Undoubtedly, Edmonton and Calgary are the two most important urban markets for Alberta producers.

In Table V the importance of the Alberta market to the local producer is shown. Of the total quantity of potatoes that originates in Alberta and that enters the commercial markets, 61 per cent is sold within the province. In the case of turnips only 48 per cent of commercially grown turnips originating in Alberta actually enter the provincial market. In regard to the other crops, however, it is to be noted that local growers are very dependent upon the Alberta market.

So far we have been mainly concerned with the physical characteristics of growth and storage of each vegetable, their relationship to the climate in Alberta, the proximity of the area of supply to the market, and the manner in which these affect the comparative advantage of Alberta as an area of supply. Of equal importance, however, is the size of the market that is available to Alberta vegetable producers. There is a direct relationship between the size of the market and the degree of specialization in production that is required

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<sup>2</sup>Implicit in the above is the assumption that the market is perfect or nearly perfect so that produce moves into the market at cost allowing only for normal profits to the producers. The period of time involved must also be assumed long enough to allow the pattern of distribution to be established on the basis of the costs of production transportation, and storage. It must also be assumed that no product differentiation exists.



Table V. - The Quantity of Commercially Grown Produce that Originates in Alberta and the Percentage that is Sold in Alberta. Based on a Five Year Average, July 1955 Through June 1960.

	: Group I :			: Group II :			: Group III :	
	:Potatoes:	Turnips:	Corn:	Cabbage:	Carrots:	Onions:	Tomatoes:	Celery:
Total commercial production grown in Alberta: in 000's lbs.	61,154	4,717	960	2,066	693	388	22	11
Total sold in Alberta in 000's lbs.	37,372	2,276	854	1,862	690	313	22	11
Percent	61.1	48.3	89.0	90.0	99.6	80.7	100.0	100.0

Source: Appendices I and II

to satisfy that market. Obviously a producer cannot specialize in the production of a particular commodity unless he has a market in which to sell his entire output. The larger the market the greater the degree of specialization. Greater specialization by a number of producers may in turn bring about both external economies and internal economies in production within a specific region, hence increasing the comparative advantage of that region.

The number of acres that are required to satisfy the commercial market in Western Canada for the eight vegetables is shown in Table VI. The starting point in this table was the size of the commercial market during a period of one year, based on the five



Table VI. - The Number of Acres Required to Satisfy the Commercial Market in Western Canada for Eight Fresh Vegetables for a Period of One Year. Based on a Five Year Average July 1955 Through June 1960.

	Group I		Group II		Group III	
	:		:		:	
	Potatoes:	Turnips :	Corn :	Cabbage :	Carrots:	Onions : Tomatoes : Celery :
Size of the commercial market in Western Canada; in 000's lbs. 1*	258,414	12,036	7,066	32,997	34,253	42,775 51,819 28,132
Estimated quantity of field run vegetables to satisfy the market; in 000's lbs. 2*	574,253	24,072	14,132	65,994	68,506	85,550 103,638 56,264
Average yield per acre in cwt. 3*	140	200	90	240	160	150 200
Acres required to satisfy markets in Western Canada	41,018	1,204	1,570	2,750	4,282	5,703 6,909 2,813
Alberta's share of the market in Western Canada in percent. 4*	23.7	39.2	13.6	6.3	2.0	0.9 0.03 0.04
Acres required to satisfy Alberta's share of the market in Western Canada.	9,721	472	214	173	86	51 2 1

Sources:

- 1\* Table IV, row 1, page 91.
- 2\* Excluding potatoes, it is estimated that only 50 per cent of the vegetables harvested for sale in the commercial market, are actually sold in that market. The 50 per cent that is not sold is an allowance for culls, waste, shrinkage, spoilage, seed, and self-supplies. It was estimated that only 45 per cent of the potatoes harvested are sold in the commercial market.
- 3\* The average yields per acre are based upon yields in the irrigation districts of Southern Alberta as estimated by staff of the Canada Research Station at Lethbridge.
- 4\* Table IV, row 3, page 91.





year average July 1955 through June 1960. From the size of the commercial market the quantity of field run vegetables that was required to supply the given commercial market was estimated.<sup>3</sup> The quantity of field run vegetables is necessarily greater than the quantity that enters commercial market because of the addition of culls, waste, shrinkage, spoilage, self-supplies and so on. Accordingly, the commercial market was adjusted upwards to allow for 50 per cent waste, culls, seed, etc.<sup>4</sup> The above allowance for waste, etc., has been made quite arbitrarily. If there is a bias it seems reasonable that the allowance made for waste, etc., is over-estimated rather than under-estimated. Discrepancies in these adjustments, however, are probably not large enough to distort the relative acreage requirements of the different vegetables as shown at the bottom of the Table. This is also true of the yield per acre estimates.

In row 4 of Table VI the number of acres that are required to satisfy the given commercial market have been calculated. These estimates represent the total acreage that would supply the commercial market in Western Canada for the period of one year, given the above conditions. However, Alberta's acreage requirements are proportional to its share in the market. Consequently, row 6 in the

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<sup>3</sup>Field run vegetables refers to the vegetables that are harvested from the field before washing and grading are performed.

<sup>4</sup>In the case of potatoes an allowance of 55 per cent was made for wastage, etc. It was reasoned that potatoes grown on a commercial scale are subject to a higher percentage of mechanical injury, uses for seed, and narrower grading standards, relative to the other vegetables.



Table shows the number of acres required of each vegetable to satisfy Alberta's share of the market.

Of interest is the fact that the number of acres required to satisfy Alberta's share of the market ranges from approximately 1 acre in the case of celery to approximately 9,721 acres in the case of potatoes. This is indicative of the number of producers that each crop can support, and the degree of specialization that they can attain. It is obvious in the case of Group II and Group III that Alberta's share of the market is not large enough to warrant specialization or large scale production of these vegetables, at the present time.

The size of the market that is available to Alberta may enlarge by one or two methods. First, growth in the population and greater urbanization may occur. Providing that Alberta maintains its share of the Western Canadian market, the market that is available to Alberta will then grow with the growth in population and urbanization. Second, the size of the market that is available to Alberta may be expanded, if Alberta is able to increase its share of the total commercial market. Given the present costs of transportation and storage the difficulties that Alberta will experience in obtaining a larger share of the commercial market in Western Canada is in part dependent upon whether or not Alberta can lower its costs of production through specialization and large scale production. The difficulties are intensified if the size of the market that is currently available is too small to allow specialization and large scale production to occur.





In this case, reliance must be made upon growth in the market as a result of an expanding population and greater urbanization. Since the principal market areas as far as Alberta producers are concerned are within the Province, the stimulus for specialization and large scale production of those vegetables other than potatoes or turnips must come from a continued growth in population and even greater urbanization.

It may be interesting at this stage to note the influence that urban centers have exerted upon the local production of fresh vegetables in two of the Western provinces. From Charts 1-1A to 8-8A, pages 49 through 84, it may be noted that "in season" local supplies account for more than 50 per cent of each of the eight commodities that enter the Manitoba market. Undoubtedly there are other factors involved, but it seems reasonable to believe that the main stimulus to local production has been the market provided by Metropolitan Winnipeg, which according to the 1956 Census, has a population of 490 thousand.

In contrast, not one of the eight commodities were supplied to the extent of 50 per cent during the "in season" by local producers in Saskatchewan. While it is generally true that the climate in Saskatchewan is more unsuitable to vegetable production than the other three Western provinces, this is not necessarily true in the case of potatoes and turnips. There are areas in Saskatchewan reasonably close to Regina and to Saskatoon that are suited to the production of potatoes and turnips. Neither city, however, has a



large population. According to the 1956 Census, Regina had a population of 89 thousand and Saskatoon had a population of 72 thousand. It seems reasonable to believe that as growth takes place within these cities they, too, will develop their own vegetable market sheds, at least for the commodities that are most adaptable to those specific regions.

It is suggested that the main stimulus to the production of fresh vegetables in local areas comes from urbanization. Associated with the growth in urban centres, specialization of production in the marketing shed occurs in various stages or "jumps". Hence, when one takes into account seasonality in production it seems reasonable to suggest that the cities of Regina and Saskatoon are too small to encourage the production of vegetables on a large commercial scale. While numerous market gardens may exist within the vicinities of these cities, the local markets are so small that from the point of view of the producer a great deal of uncertainty must exist about market prices. This is so because in a small market the selling actions of individual producers have a greater influence upon the market price.<sup>5</sup> In such a situation the producer is more or less forced to diversify rather than specialize his production unit.<sup>6</sup> Consequently, when the given market is

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<sup>5</sup> Assuming that producers act independently.

<sup>6</sup> Product diversification is defined as the production of several different commodities by a firm. Johnson says that a firm may introduce diversification for several reasons, but the most important reason is that of stabilizing the firm's income.

See: D. Gale Johnson, Forward Prices For Agriculture, Chicago 1947, p. 48.



small the costs of production are high, relative to the situation in which producers may specialize. This, in part, may explain why the Saskatchewan market up until the present time has been predominantly supplied from other areas.

On the other hand it would appear that the market in Winnipeg for commercial grown vegetables is large enough to support numerous local growers. It also seems reasonable to believe that the Winnipeg market is large enough to encourage specialization in different commodities by the local growers. A situation, then, in which there are a large number of producers, may give rise to a market in which on the supply side the producers approach the state of perfect competition. In this case one would expect the wholesale prices that are paid for domestic grown produce to be lower than in markets which are less competitive on the supply side. The supposition that a relatively high degree of competition does exist on the supply side in the Manitoba market may in part explain the earlier observation made from Figures 3 through 10, that wholesale prices are generally lower in Manitoba than in the other three provinces.

Let us now return to Alberta's position as an area of supply to Western Canada. As previously stated, one of the factors that limits the size of Alberta's share of the market in the other three provinces is the fact that when vegetables are in season in Alberta they are also in season in the other provinces. Just as Alberta producers have a locational advantage within the province of Alberta, so must it be considered that local producers





have a locational advantage in their respective provinces. From this it follows that given the costs of distribution, if an advantage is to accrue to Alberta producers in supplying "outside" markets, it will have to come about as a result of lower costs of production.

But, to achieve lower costs of production, specialization must take place. In the case of potato production and turnip production, a degree of specialization has already taken place. In the case of celery and tomatoes it is evident that the growth and storage characteristics of these vegetables makes them unadaptable to production on a commercial scale in Alberta at the present time.

Specialization in the production of these vegetables is therefore dependent upon growth in the commercial market. Growth in the commercial market is in turn dependent upon an increase in the population, especially in the urban sector. From the point of view of producers in Alberta it is desirable that relative to other parts of Western Canada the largest increase in urban development should take place in the local centres. For it is the urban centres which are in close proximity that provide Alberta producers with a commercial market in which they have a locational advantage.

Growth in the size of the commercial market is relatively slow as compared to the speed with which the output of any of the above commodities can be expanded. In Table VII the number of people that one acre will supply through the commercial market



Table VII. - The Number of People that One Acre will Supply through the Commercial Market. Based on the Per Capita Consumption in Western Canada of Eight Fresh Vegetables.

	Group I		Group II		Group III			
	:	:	:	:	:			
	Potatoes:	Turnips :	Corn :	Cabbage :	Carrots :Onions:Tomatoes: Celery :			
Per Capita Consumption in lbs. 1*	122.4	4.3	3.0	12.9	12.5	13.7	16.2	7.3
Yield per Acre, Field Run, in lbs.	14,000	20,000	9,000	24,000	16,000	15,000	15,000	20,000
Yield per Acre, at Commercial Market, in lbs.	6,300	10,000	4,500	12,000	8,000	7,500	7,500	10,000
People per Acre	51	2,326	1,500	930	640	547	463	1,370

1\* Per capita consumption as calculated for Western Canada from Table VI, page 94.

2\* Allowance has been made for culls, wastage, and spoilage, as shown in footnote 2, Table VI, page 94.





for a period of one year has been calculated for each of the commodities. In this Table the yields per acre were estimated as representative of the crops grown in the irrigation districts of Southern Alberta. Included in the calculation was a liberal allowance for wastage. Accordingly, if a bias exists it should tend to minimize the number of people per acre. It will be noted from the Table that one acre of potatoes will supply approximately 51 people for a period of one year. In contrast, one acre of turnips will supply approximately 2,326 people, or nearly 45 times as many people. This is an indication, then, of the rapidity with which production can expand. From a slightly different point of view, it is an indication of the growth in the urban population that must occur to warrant an increase in production by the amount of one acre.<sup>7</sup>

Two other points should be made clear: First, the influence of seasonality upon the "people per acre" estimates, and second, the manner in which technology and specialization will affect the "people per acre" estimates.

In regard to the influence of seasonality upon the "people per acre" estimates, it should be pointed out that the estimates refer to the period of one year. The production of these crops, however, are seasonal. Likewise, the time during which the crops may be stored is only some fraction of the year. Consequently, one acre of land will satisfy a greater number of people

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<sup>7</sup>Given, of course, the existing market prices with no changes in the per capita consumption.



during some fraction of the year than it will over the course of the entire year. As an example, in Alberta the length of the potato season plus the length of the storage season of potatoes, is approximately 10 months. The number of people that one acre of Alberta grown potatoes will satisfy during the period of 10 months is

$\frac{12 \times 51}{10} = 61$  people. Corn is an exception, because it is consumed

on a seasonal basis as it is produced. The point is, however, that for those commodities which we assume to have a constant demand throughout the year, the shorter the period of production and storage the larger is the number of people that one acre of produce can satisfy. Once again this is indicative of the growth that must take place in the size of the commercial market in Western Canada, and particularly in Alberta, to warrant specialization in the production of the vegetables included in Groups II and III.

The total output of a commodity may expand for reasons other than an increase in the acreage of that commodity. Ignoring the effects of erratic changes that may occur as the result of weather conditions, the total output per acre may increase over time due to the adaptation of new techniques and innovations in production. By the same token, any increase in efficiency in the marketing chain which eliminates wastage of produce may increase the number of people that one acre of produce can satisfy. Since the adoption of new techniques and new innovations are usually associated with specialization in production, it seems



likely that as long as the size of the market which is available to a specific region of supply does not warrant specialization in production, any tendency toward specialization would in fact be self-defeating. This would be true if the size of the market that is available to the specific area of supply is fixed. The size of the market that is available to a specific area of supply is flexible. There is an inverse relationship between the size of the market which is available to the specific market area and the costs of production and the costs of distribution relative to that area. Thus as specialization of production takes place within a specific area of supply the internal and external economies that are associated with specialization may lower the costs of production and of distribution to the extent that the market which is available to the area may enlarge by a substantial amount.

The above suggests that specialization within a specific area of supply is a function of the size of the market that is available to that specific area until the size of the market reaches a certain point. After this point has been reached the size of the market becomes a function of specialization within the specific area of supply. The size of the market which is currently available to Alberta producers of such commodities as cabbages and corn is not conducive to the type of specialized production that warrants large scale operations and which could bring about both internal economies and external economies. With continued growth in the size of the commercial market a point will be reached eventually that does warrant large scale operations in the production of these commodities. At this stage, the lower





costs of production and distribution accompanying specialization will give the Alberta producers an advantage in the market. As a result, their share of the market will increase, hence the size of the market available to them will likewise increase, and with the enlarging market further specialization can be expected. Expansion of production will of course be slowed down or eventually stopped by the counter force of external and internal diseconomies.

It can be seen therefore that growth in the local commercial markets are important to the Alberta producers. For it is within these local markets that the Alberta producers have a locational advantage. And, in the initial stages of a growing commercial market, it is the local markets that are the only markets available to the provincial growers. Hence, if the Alberta market grows at a faster rate than other markets in Western Canada, the Alberta producers are in a fortunate position for it means that they will reach the stage of specialization earlier and thereby enhance their position in the Western Canadian market relative to the other provincial areas of supply.

Recognition must be given to the fact that there are numerous factors which change the size of the commercial market. It would appear, however, that the most important factor in determining the size of the commercial market is the growth in population that takes place in the urban centres.

In summary, change is continually taking place both on the demand side and the supply side of the markets in Western Canada for the eight fresh vegetables under study. Because of the



impossible task of deriving supply and demand curves the analysis in this study has been conducted in terms of the size of the commercial market. Growth in the size of the market is considered as analogous to the demand side of the market. The costs of production and the costs of distribution from different areas of supply and the comparative advantage of the respective areas are considered as pertaining to the supply side of the market. There are numerous factors which are involved that determine the comparative advantage of any one area at a specific point in time. Assuming, however, that movements of produce are relatively unrestricted, the comparative advantage of any one area of supply can be and is decided on the basis of lowest costs. The costs of production and distribution are in part a reflection of the physical characteristics and the storage characteristics of the vegetables in question. It is, however, the size of the market that is available to a specific area of supply that determines the type of production and the degree of specialization that will take place in that area at any given time. The size of the market available to any specific area of supply is a complex thing determined on the basis of the relationships that exist between the costs of production and distribution, the seasonality of the product, and the size of the population that is almost wholly dependent upon the commercial market. For the purposes of this study the size of the available market area is confined within the limits of the geographic area of Western Canada and the period of one year.





The size of the market that is available to Alberta producers is different for the different commodities. The most important determinants of the size of the market to Alberta producers are: the size of the population in urban centres within the province, the per capita consumption of the product, and the length of the harvest season plus the length of the storage season of the commodity. Of the eight commodities included in this study, potatoes is the one commodity in which specialization and large scale production has occurred within the province. Potatoes are unique amongst the eight commodities in as much as their growth is well adapted to the climatic conditions of Alberta, the "in season" plus the storage season, make it feasible to market Alberta grown potatoes for at least 10 months of the year, and the high per capita consumption of potatoes multiplied by the urban population within Alberta provide local growers with a large market in which they have a locational advantage. Consequently, the acreage that is required to satisfy the provincial market is large enough to stimulate specialization and large scale production of potatoes within the province. Specialization and large scale production of potatoes in turn gives Alberta producers an advantage in enlarging their share of the market for potatoes in the other Western Provinces.

The only difference between potatoes and turnips is that the per capita consumption of turnips is very low. Consequently, the number of acres required by Alberta producers to satisfy the market is much less.



In the case of corn, cabbages, carrots and onions, the length of the marketing season for Alberta grown produce is relatively short. Consequently the available market is relatively small and likewise the number of acres required to satisfy that market is not large enough to warrant specialization or large scale production of these commodities within Alberta at the present time. Because one acre can satisfy a large number of people through the commercial market, growth in the commercial market from the producer's point of view is necessarily slow. This is especially true in the case of Alberta producers whose marketing season for the above products is relatively short, hence the number of people that one acre will satisfy is very large.

In the case of tomatoes and celery the marketing season for Alberta grown produce is also short. The main inhibitors to expansion of production in Alberta of these commodities are the costs of production and the quality of produce as compared to alternative areas of supply such as California and Mexico.

The fundamental reasons that explain Alberta's rather small share of the market in Alberta and in Western Canada for the majority of the eight commodities in question can be stated in terms of the comparative advantage of Alberta as an area of supply relative to the many other areas of supply to Western Canada. The comparative advantage is determined on the basis of lowest costs of placing a commodity into a specific market area. The costs are in turn determined by a number of complex factors including



the growth and storage characteristics of the commodity, the seasonality of the commodity, proximity of the area of supply to the market area, and the size of the available market (Particularly the size of the local market). While it is no doubt true that there are other barriers in the chain of marketing, such as the lack of continuity of supply on the part of Alberta producers, a lack of contact between the grower and wholesaler, and the lack of modern processing of Alberta grown fresh vegetables, it would appear that these latter barriers are secondary and perhaps a symptom, of the more fundamental barriers associated with comparative advantage.





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## APPENDICES

The data used in the foregoing study are of a secondary type. The sources from which the data have been compiled are reports filed by provincial and federal government personnel: published and unpublished. Nearly all of the data used in the study were transcribed from the various sources by the author. The data were then sorted and tabulated by the author with the aid of the clerical staff of the Economics Division.

Appendix I is a series of tables which show the quantity of each vegetable that entered the commercial market each month in the individual provinces averaged over the five year period July 1955 through June 1960. The commercial market is comprised of both domestic grown produce and imported produce. The sources of the data are as follows.

1) The total imports were obtained from unpublished data compiled by the Dominion Bureau of Statistics. In the data are recorded the quantity of each commodity that entered Canada each month according to the country of origin and the province of destination. The import statistics are reported to the Dominion Bureau of Statistics by the Canadian custom officials.

2) The monthly truck and carlot unloads of domestic grown produce at six major cities in Western Canada were obtained from the Annual unload Report Fresh Fruit and Vegetables on 12 Canadian Markets, published by the Canadian Department of Agriculture, Ottawa. The data in the above report are compiled in the following manner. Wholesale firms in each of the major cities report daily the quantity of each commodity that is unloaded on their premises to Federal Fruit and Vegetable inspectors stationed in each of the cities. The daily report also includes the origin of the produce, the type of carrier, and the average wholesale price paid for each commodity. The





Fruit and Vegetable inspectors convert the quantity of each commodity that is reported into carlot equivalents. This, along with the other information, they send once a week to Ottawa, where the data from the 12 major cities in Canada are compiled and published annually.

3) The monthly truck and carlot unloads of domestic grown produce at centres in Western Canada other than the six centres referred to above were obtained directly from inspection certificates issued by Fruit and Vegetable inspectors. The inspection certificates show the type and variety of vegetable, the grade, the origin, destination and quantity shipped. All master copies of the inspection certificates are sent to the Fruit and Vegetable Division, Ottawa, where they are kept on file. The author was fortunate enough to have access to this file.

There are three weak points in the compilation of the above data. First, the destination of imports from the United States are recorded as of the port of entry. Thus, vegetables entering one province but destined for another province are recorded as destined for the first. As an example, carlots destined for Saskatchewan but entering at a port of entry in Manitoba are recorded by customs officials as imports entering Manitoba. Therefore it is possible that the size of the commercial market in each of the provinces may be slightly distorted. It will, however, have little influence upon the size of the commercial market when Western Canada is considered as a whole. Second, the weights of the vegetables unloaded at the wholesales in the six major cities in Western Canada are converted into units of carlots and are recorded in numbers of carlots and trucklots, the latter are equivalent to carlots. In order to convert the carlot and trucklot weights into hundred-weight the appropriate factor must be used for each commodity, (carlot weights range from 24,000 pounds for corn to 40,000 pounds for potatoes). There is



the possibility that an error has been introduced that is bias high or low because the wrong weight was used as a conversion factor. To avoid this type of error it is suggested that the Fruit and Vegetable Division change its standard of measurement from units of carlots and trucklots to units of hundredweight. Third, it is probable that not all of the quantities of each vegetable unloaded at centres other than the major cities are recorded by the issuance of inspection certificates. By an act of the British Columbia legislature carlots and trucklots moving out of British Columbia must be inspected. On the other hand shippers and buyers who have carlots or trucklots originating in the Prairie Provinces voluntarily may call for an inspection. From talks with Fruit and Vegetable inspectors and with people in the wholesale trade the author was given to believe that less than 75 per cent of the vegetables moving into the commercial markets at centres other than the six major cities are inspected. Consequently, there is error in the data that is bias in as much that larger quantities enter the commercial market than are recorded. However, this error applies to a section of the data that is a very small proportion of the total volume of vegetables that are sold through the commercial market, and therefore the error may be considered as insignificant.

Appendix II consists of a series of tables which show the quantity of Alberta grown produce that has entered the commercial markets in Western Canada averaged over the five year period July 1955 through June 1960. These tables were compiled from the Annual Unload Report and from inspection certificates.

Two tables are shown in Appendix III. Table 1 is an example of the calculations used by the Dominion Bureau of Statistics to estimate the apparent per capita disappearance of certain fresh vegetables in Canada.







Table 2 is an estimate of the apparent per capita disappearance of certain vegetables in Canada, 1940-1959. Both of these tables were compiled from estimates made by the Dominion Bureau of Statistics.



Month	: Manitoba	: Saskatchewan	: Alberta	: British Columbia	:: Western Canada
	-		In cwt		-
July	7,070	2,534	4,964	6,702	21,270
August	5,822	510	2,655	4,832	13,819
September	6,726	543	2,522	5,453	15,244
October	8,808	1,306	3,906	6,353	20,373
November	9,615	1,517	5,282	7,062	23,476
December	8,771	2,827	6,146	8,983	26,727
January	8,460	3,449	7,433	11,360	30,702
February	6,804	4,098	7,937	13,144	31,983
March	8,738	5,033	9,997	14,348	38,116
April	7,493	5,500	8,991	14,010	35,994
May	8,640	5,372	9,470	12,806	36,288
June	8,240	5,519	10,481	11,740	35,980
Total	95,187	38,208	79,784	116,793	329,972

Month	Manitoba	Saskatchewan	Alberta	British Columbia	Western Canada
			in cwt		
July	4,471	2,458	7,297	14,203	28,429
August	3,788	955	3,122	12,306	20,171
September	5,893	612	2,449	8,159	17,113
October	7,496	728	3,878	7,485	19,587
November	7,307	1,173	4,106	10,951	23,537
December	7,654	1,741	5,731	15,178	30,304
January	8,353	1,928	5,766	14,574	30,621
February	7,708	2,557	6,999	16,711	33,975
March	7,459	3,075	7,917	18,053	36,504
April	7,083	3,642	7,651	18,234	36,610
May	6,754	2,802	8,220	17,463	35,239
June	5,767	2,317	6,803	15,554	30,441
Total	79,733	23,988	69,939	168,871	342,531



APPENDIX I

Table A3.- The Entry of Celery into the Commercial Markets of Western Canada. Based on a Five Year Average, July 1955 through June 1960.

Month	Manitoba	Saskatchewan	Alberta	British Columbia	Western Canada
in cwt					
July	4,372	2,559	6,305	9,539	22,675
August	3,841	1,765	4,194	7,032	16,832
September	3,844	1,682	3,644	7,623	16,793
October	3,366	2,282	4,834	8,899	19,381
November	3,338	2,527	5,344	5,417	16,626
December	4,768	4,087	6,611	13,952	29,418
January	4,336	3,182	7,617	12,486	27,621
February	3,921	3,279	6,036	10,968	24,204
March	4,412	3,387	7,557	11,982	27,338
April	4,511	3,846	6,760	11,679	26,796
May	4,409	3,459	7,281	12,336	27,485
June	4,079	3,592	6,944	11,539	26,154
Total	49,197	35,547	73,127	123,452	281,323

Table A4.- The Entry of Corn into the Commercial Markets of Western Canada. Based on a Five Year Average, July 1955 through June 1960.

Month	Manitoba	Saskatchewan	Alberta	British Columbia	Western Canada
in cwt					
July	960	816	3,792	9,168	14,736
August	6,912	1,680	5,616	9,312	23,520
September	4,464	912	3,792	6,864	16,032
October	192		912	1,680	2,784
November	96		336	624	1,056
December			288	192	480
January					
February				48	48
March				48	48
April	96		192	288	576
May	432	240	384	1,728	2,784
June	672	432	2,256	5,232	8,592
Total	13,824	4,080	17,568	35,184	70,656





APPENDIX I

Table A5.- The Entry of Onions into the Commercial Markets of Western Canada. Based on a Five Year Average, July 1955 through June 1960.

Month	Manitoba	Saskatchewan	Alberta	British Columbia	Western Canada
			in cwt		
July	6,257	4,337	6,247	14,346	31,187
August	7,148	2,935	6,943	11,714	28,740
September	13,149	4,324	9,803	13,139	40,415
October	15,779	5,627	7,840	15,034	44,280
November	9,949	2,365	6,707	11,030	30,051
December	8,648	1,998	5,013	13,323	28,982
January	11,654	4,265	7,960	15,179	39,058
February	11,309	4,225	8,593	14,630	38,757
March	9,409	3,479	9,089	18,522	40,499
April	6,469	3,064	7,000	20,799	37,332
May	6,601	3,611	9,169	13,633	33,014
June	7,669	4,637	9,406	13,726	35,438
Total	114,041	44,867	93,770	175,075	427,753

Table A6.- The Entry of Potatoes into the Commercial Markets of Western Canada. Based on a Five Year Average, July 1955 through June 1960.

Month	Manitoba	Saskatchewan	Alberta	British Columbia	Western Canada
			in cwt		
July	50,411	31,512	64,438	108,524	254,885
August	59,396	14,078	38,692	94,963	207,129
September	56,104	12,045	33,048	98,543	199,740
October	75,089	21,036	33,192	110,313	239,630
November	62,935	20,873	36,801	96,663	217,272
December	44,458	14,281	33,192	87,226	179,157
January	50,717	16,941	40,815	101,058	209,531
February	55,001	16,382	37,064	86,302	194,749
March	60,119	21,125	43,814	93,393	218,451
April	50,280	19,880	36,763	91,254	198,177
May	45,175	15,472	41,258	95,934	197,759
June	54,712	23,852	55,119	133,900	267,663
Total	664,397	227,477	494,196	1,198,073	2,584,143



APPENDIX I

Table A7.- The Entry of Tomatoes into the Commercial Markets of Western Canada. Based on a Five Year Average, July 1955 through June 1960.

Month	: Manitoba	: Saskatchewan	: Alberta	: British Columbia	:: Western Canada
	in cwt				
July	13,380	8,959	13,119	23,207	58,665
August	16,867	10,250	21,029	26,217	74,363
September	11,129	5,272	11,286	17,828	45,515
October	5,564	4,049	9,174	14,959	33,746
November	6,156	3,832	8,729	12,638	31,355
December	6,415	3,530	6,611	9,745	26,301
January	7,366	4,021	8,856	12,291	32,534
February	6,789	3,897	8,919	11,083	30,688
March	7,963	4,135	9,326	12,445	33,869
April	9,886	4,914	10,058	14,053	38,911
May	11,105	5,688	11,991	22,543	51,327
June	13,436	7,330	15,056	25,097	60,919
Total	116,056	65,877	134,154	202,106	518,193

Table A8.- The Entry of Turnips into the Commercial Markets of Western Canada. Based on a Five Year Average July 1955 through June 1960.

Month	: Manitoba	: Saskatchewan	: Alberta	: British Columbia	:: Western Canada
	in cwt				
July	594	264	1,122	3,036	5,016
August	1,782	132	924	2,112	4,950
September	3,630		1,320	3,545	8,495
October	6,072	304	2,508	4,320	13,204
November	4,686	401	2,904	3,786	11,777
December	4,224	604	2,964	5,166	12,958
January	5,742	728	3,492	5,950	15,912
February	4,366	355	3,762	5,139	13,622
March	4,356	924	3,434	5,724	14,438
April	4,290	462	2,508	3,279	10,539
May	2,772	264	1,650	1,399	6,085
June	1,320	132	594	1,320	3,366
Total	43,834	4,570	27,182	44,776	120,362







APPENDIX II

Table B1.- The Entry of Alberta Grown Cabbage into the Commercial Markets of Western Canada Based on a Five Year Average July 1955 through June 1960.

Month	Manitoba	Saskatchewan	Alberta	British Columbia	Western Canada
in cwt					
July			312		312
August			2,184		2,184
September		70	2,496	16	2,582
October		253	3,536	10	3,799
November		434	4,056	15	4,505
December		272	2,756	156	3,184
January	270	333	1,612	109	2,324
February		104	988		1,092
March			572		572
April			104		104
May					
June					
Total	270	1,466	18,616	306	20,658

Table B2.- The Entry of Alberta Grown Carrots into the Commercial Markets of Western Canada Based on a Five Year Average July 1955 through June 1960.

Month	Manitoba	Saskatchewan	Alberta	British Columbia	Western Canada
in cwt					
July					
August			360		360
September			1,380		1,380
October		5	1,800		1,805
November			1,260		1,260
December			840		840
January		22	660		682
February			360		360
March			180		180
April			60		60
May					
June					
Total		27	6,900		6,927



APPENDIX II

Table B3.- The Entry of Alberta Grown Celery into the Commercial Markets of Western Canada Based on a Five Year Average July 1955 through June 1960.

Month	Manitoba	Saskatchewan	Alberta	British Columbia	Western Canada
	-		in cwt		-
July					
August					
September			108		108
October					
November					
December					
January					
February					
March					
April					
May					
June					
Total			108		108

Table B4.- The Entry of Alberta Grown Corn into the Commercial Markets of Western Canada Based on a Five Year Average July 1955 through June 1960.

Month	Manitoba	Saskatchewan	Alberta	British Columbia	Western Canada
	-		in cwt		-
July					
August		768	4,848		5,616
September		288	3,696		3,984
October					
November					
December					
January					
February					
March					
April					
May					
June					
Total		1,056	8,544		9,600





APPENDIX II

Table B5.- The Entry of Alberta Grown Onions into the Commercial Markets of Western Canada Based on a Five Year Average July 1955 through June 1960.

Month	Manitoba	Saskatchewan	Alberta	British Columbia	Western Canada
	-		in cwt		-
July					
August					
September		204	136		340
October		68	544		612
November		476	1,360		1,836
December			952		952
January			68		68
February					
March			68		68
April					
May					
June					
Total		748	3,128		3,876

Table B6.- The Entry of Alberta Grown Potatoes into the Commercial Markets of Western Canada Based on a Five Year Average July 1955 through June 1960.

Month	Manitoba	Saskatchewan	Alberta	British Columbia	Western Canada
	-		in cwt		-
July	80	320	10,800	10,160	21,360
August		2,480	33,760	12,880	49,120
September	490	5,674	31,050	9,925	47,139
October	2,310	11,650	33,039	13,353	60,352
November	2,814	15,405	36,651	20,462	75,332
December	1,210	8,966	33,088	20,680	63,944
January	2,125	9,518	40,462	7,243	59,348
February	4,787	9,564	36,523	6,788	57,662
March	6,304	12,132	42,980	5,097	66,513
April	4,810	10,130	32,760	7,712	55,412
May	430	5,144	28,768	4,330	38,672
June	80	1,410	13,840	1,360	16,690
Total	25,440	92,393	373,721	119,990	611,544





APPENDIX II

Table B7.- The Entry of Alberta Grown Tomatoes into the Commercial Markets of Western Canada Based on a Five Year Average July 1955 through June 1960.

Month	Manitoba	Saskatchewan	Alberta	British Columbia	Western Canada
			in cwt		
July			56		56
August					
September					
October					
November					
December					
January					
February					
March					
April					
May					
June			168		168
Total			224		224

Table B8.- The Entry of Alberta Grown Turnips into the Commercial Markets of Western Canada Based on a Five Year Average July 1955 through June 1960.

Month	Manitoba	Saskatchewan	Alberta	British Columbia	Western Canada
			in cwt		
July					
August			792	264	1,056
September			1,320	1,433	2,753
October		36	2,508	1,878	4,422
November		137	2,640	1,278	4,055
December		142	2,766	2,262	5,170
January	292	266	3,426	4,099	8,083
February	212	25	3,696	4,017	7,950
March			2,904	3,876	6,780
April		132	1,716	2,939	4,787
May		66	660	990	1,716
June			330		330
Total	504	804	22,758	23,036	47,102



APPENDIX III

Table 1. An Example of the Calculations Used by the Dominion Bureau of Statistics to Estimate the Apparent per Capita Disappearance of Certain Fresh Vegetables in Canada. (Celery for the year 1957).

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Estimated total celery acreage in Canada <u>1/</u>	2,300
Estimated yield per acre <u>1/</u>	<u>19,800</u> lbs.
Estimated total production <u>1/</u> <u>2/</u>	45,638,000 lbs.
Less total exports <u>3/</u>	
Add total imports <u>3/</u>	<u>90,650,000</u> lbs.
Available supplies	136,288,000 lbs.
Less supplies to processors <u>3/</u>	7,305,000 lbs.
Less calculated waste <u>3/</u>	<u>14,115,000</u> lbs.
	114,868,000
Estimated total population 1957 16,589,000 people <u>4/</u>	
Apparent per capita disappearance of celery in Canada in 1957	
	$\frac{114,868,000}{16,589,000} = 6.9 \text{ lbs.}$

- 
- 1/ From, Crop and Seasonal Price Summaries, Vol. 12, Part II, p. 46.  
2/ Total production is weighted by the acreage and yield in the different provinces.  
3/ Unpublished material from the Dominion Bureau of Statistics.  
4/ Estimated population of intercensal years made by the Dominion Bureau of Statistics.





APPENDIX III

Table 2.- Estimated Apparent per Capita Disappearance of Certain Vegetables in Canada, 1940-1959.

Year : Cabbage : Carrots : Celery : Corn : Onions:Potatoes:Tomatoes:Turnips								
- pounds per capita per annum -								
1940		14.9				190.8		
1941		11.9				194.4		
1942		22.2				182.0		
1943		12.6				189.2		
1944		12.7				172.8		
1945	9.8	11.1	4.7	3.9	9.0	156.8	17.0	2.4
1946	11.2	11.4	4.9	6.6	9.5	178.5	32.0	2.4
1947	11.9	12.2	5.1	2.0	12.4	142.1	30.8	3.1
1948	14.6	11.3	3.1	0.3	14.7	163.7	12.1	3.0
1949	11.3	10.7	6.5	4.6	13.0	158.8	17.8	3.0
1950	12.4	13.1	6.1	4.4	15.1	177.5	17.9	3.7
1951	10.9	12.9	6.4	2.8	11.7	143.3	19.3	3.8
1952	11.1	11.6	7.0	2.7	12.7	146.8	18.8	3.1
1953	10.6	11.4	7.2	2.5	12.7	155.9	20.0	3.1
1954	10.5	11.4	7.6	2.8	12.4	146.3	19.5	3.1
1955	10.1	11.6	7.6	2.5	12.8	148.5	19.0	2.9
1956	10.7	11.8	7.6	2.7	12.0	153.3	18.3	2.9
1957	9.9	11.8	6.9	2.9	11.5	161.1	15.3	3.0
1958	12.0	15.1	6.7	3.8	11.2	130.8	17.2	2.8
1959	10.4	15.4	6.9	4.6	11.7	134.3	17.8	2.8

Source: Unpublished material from the Dominion Bureau of Statistics.

















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